

# COMMERCIAL FISHERIES REVIEW

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## IRRADIATION PRESERVATION OF SEAFOOD

U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF COMMERCIAL FISHERIES

FRESH SEAFOOD ON ICE  
WILL KEEP ABOUT 14 DAYS

**IRRADIATION**  
WILL DOUBLE THIS  
KEEPING TIME AND  
INCREASE  
FRESH FISH SALES

HIGH QUALITY  
FRESH FISH  
WILL REACH



INLAND MARKETS

### COOPERATIVE



### GOVERNMENT-INDUSTRY STUDIES

YOU

- selecting suitable species
- determining optimum radiation levels
- establishing maximum storage time
  - at different storage temperatures
- providing for FDA wholesomeness clearance
- testing and selecting packaging materials
- conducting economic feasibility analysis

VOL. 27, NO. 10

OCTOBER 1965

**UNITED STATES DEPARTMENT OF THE INTERIOR**  
*Fish and Wildlife Service*  
**Bureau of Commercial Fisheries**  
*Washington, D.C.*

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UNITED STATES  
DEPARTMENT OF THE INTERIOR

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# COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

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# COMMERCIAL FISHERIES REVIEW

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## PASTEURIZATION OF FISHERY PRODUCTS WITH GAMMA RAYS FROM A COBALT-60 SOURCE

By Louis J. Ronsivalli\* and J. W. Slavin\*\*

### ABSTRACT

This paper describes research on radiation-pasteurization of fresh fish so as to extend its shelf life. The U.S. Bureau of Commercial Fisheries Technological Laboratory in Gloucester, Mass., conducted the research under a contract from the U.S. Atomic Energy Commission.

The results indicate that a number of economically important North Atlantic fishery products can be held refrigerated in an acceptable condition for at least one month after treatment with low doses of gamma radiation without significant nutritive losses. The method is practical even when 50 percent of the shelf life has been used up.

An investigation of the chemistry of fish flavors and odors has not, thus far, uncovered any evidence that irradiation causes the formation of aberrant or unusual compounds.

Packaging studies showed that many commercially available plastic materials are suitable for packaging radiopasteurized fishery products and that in most cases unsuitability was apparently due to high gas permeability rates and poor sealing characteristics.

Total plate counts conducted before and after irradiation with 250,000 rads indicated that the bacterial flora in haddock fillets was reduced by approximately 99 percent.

### SUMMARY

Research on radiation-pasteurization of fresh fish to extend its refrigerated shelf life was conducted by the U. S. Bureau of Commercial Fisheries Technological Laboratory at Gloucester, Mass., under a contract from the U. S. Atomic Energy Commission.

The results thus far indicate that clam meats and haddock, cod, pollock, and ocean perch fillets can be held refrigerated in an acceptable condition for at least one month after treatment with low doses of gamma radiation (150-450 kilorads).

The effect of irradiation on amino acids and B-vitamins was relatively insignificant and certainly not greater than the effects of cooking or of seasonal variations.

Suitable techniques for studying volatile carbonyl and sulfide compounds in clam meats and fish fillets have been developed and changes in the concentrations of carbonyls and sulfides, caused by irradiation, storage, and cooking, have been determined. At least 20 aldehydes, ketones, and sulfides have been identified in the volatiles of clam meats.

Data have been obtained to show that radiation-pasteurization of haddock fillets has practical application even when the fillets have been stored in ice for more than half their normal shelf life prior to irradiation.

Experiments to determine the suitability of available plastic films or wrappings as packaging materials for irradiated fishery products showed that films having a relatively low oxy-

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U. S. DEPARTMENT OF THE INTERIOR  
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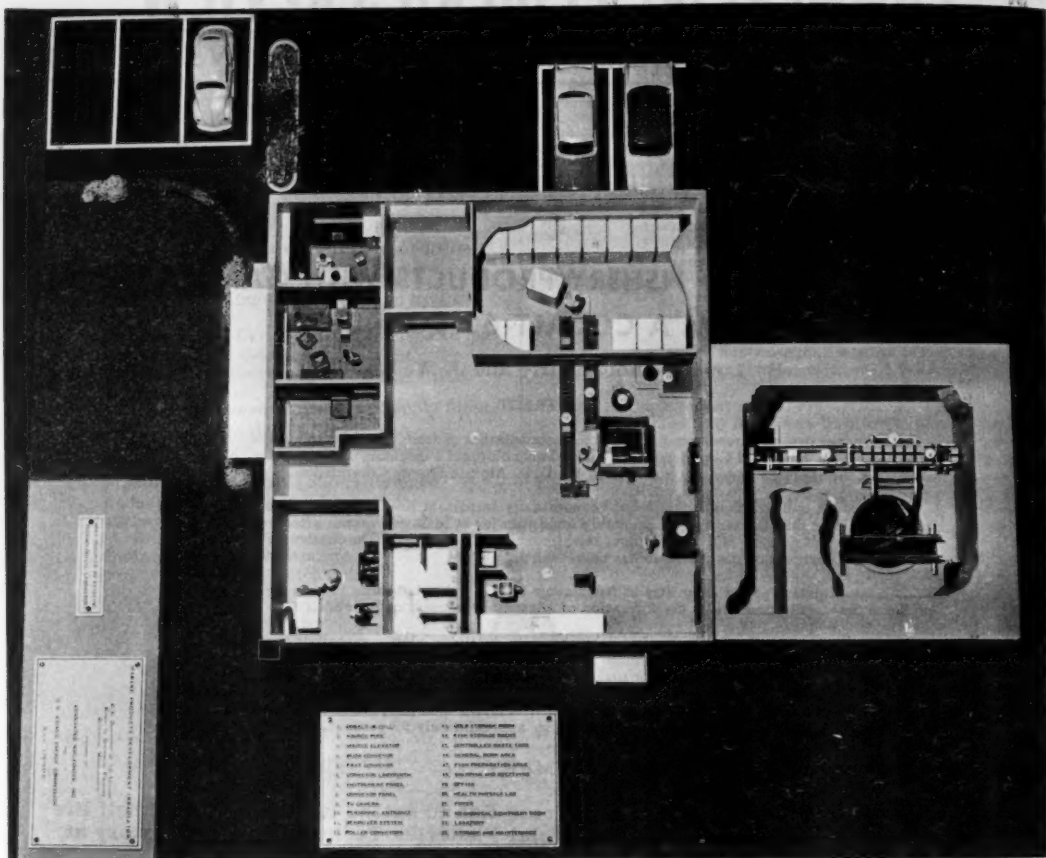


Fig. 1 - Model of Marine Products Development Irradiator.

gen permeability are suitable and those having a relatively high oxygen permeability are unsuitable. The films tested (polyethylene, polypropylene, polyester, nylon-11, and others) were found to be resistant to bacterial penetration. They were also relatively free from pinholes and their seams were adequately strong.

It was found that the bacterial numbers in fresh haddock fillets were reduced by at least 99 percent by irradiation with 250,000 rads.

#### BACKGROUND

The value of fishery products as a source of protein is well known and since man's dependence on them is anticipated to increase, it is inevitable that he apply his latest technology to the sea. In general, fishery products are relatively perishable and consequently distribution of fresh fish and shellfish is limited to coastal areas. Wider distribution is possible when those products are either heat-processed or frozen; however, in most cases, fresh fish and shellfish, like fresh fruits and vegetables, command a higher consumer preference and a higher selling price than their frozen counterparts.

Since the discovery that ionizing radiations can be used to preserve food, much work has been done, especially in recent years, on the use of this energy for sterilization of many foods including fish and shellfish. The application of high levels of energy to those products resulted in significant quality loss from irradiation-induced flavors and odors. However, early

research indicated that the refrigerated storage life of fishery products could be significantly extended without objectionable quality changes when irradiated with pasteurizing doses of ionizing radiations (less than one megarad).

This paper reports on the results of research at the Bureau of Commercial Fisheries Technological Laboratory in Gloucester, Mass., on pasteurization of fishery products with gamma rays from cobalt-60. Objectives were to determine:

- (1) The commercial species of Atlantic fish and shellfish to which radiation-pasteurization is suitable.
- (2) The optimum level of radiation for each species. The optimum level might be defined as that dose which permits a significant extension in the refrigerated shelf life of the product without causing objectionable alterations in product quality. A marketing survey conducted in 1960 indicated that if fish and shellfish could retain their fresh quality for 3 to 4 weeks, their distribution could be extended to all points in the United States. Hopefully, this would result in increased per capita consumption of fishery products, especially fresh fish.
- (3) The effect on quality of irradiating the products in aerobic (oxygen) and anaerobic (non-oxygen) environments.
- (4) The effect on shelf life of storage at near-freezing temperature (32°-35° F.) and at the temperature of domestic refrigerators (about 42° F.).
- (5) The effects of irradiation, cooking, and extended storage on the concentration of free and total amino acids and B-vitamins.
- (6) Changes in composition of compounds as a result of irradiation and extended storage.
- (7) The suitability of available flexible packaging materials as containers for irradiated fishery products.
- (8) The effect of pre-irradiation quality of fish on post-irradiation shelf life.

#### THE RESEARCH PROGRAM

OPTIMUM DOSE AND ACCEPTANCE STUDIES: The work schedule to determine the process feasibility and optimum dose levels was designed to permit investigations at the rate of two species a year. Haddock fillets (Melanogramus aeglefinus) and soft-shell clam meats (Mya arenaria) were studied first.

Experiments were conducted to determine:

- (1) The optimum dose for air- and vacuum-packed products.
- (2) Their storage life at 33° F. and at 42° F.
- (3) Their level of acceptability during storage after irradiation at the optimum dose.

To determine optimum doses, the samples were packed in cans in air or under vacuum, irradiated at different doses and stored at 33° F. and at 42° F. Periodically the organoleptic quality of the samples was compared with that of fresh or fresh frozen samples. At the end of each experiment, the average organoleptic score of the samples from each of several dose levels was compared with the average score of the control samples. That dose that permitted the product to be held for 30 days and that resulted in scores least different from the con-

trol samples was considered to be the optimum dose. Student's t-test was applied to determine the degree to which the irradiated products differed from the controls.

To determine acceptability, samples were air-packed (when the optimum dose studies did not indicate a necessity for vacuum-packing), irradiated at the optimum dose, stored at 33° F., and periodically examined organoleptically by the single stimulus method using a nine-point hedonic scale.

Table 1 - Optimum Radiation Levels for Some Fishery Products

Product	Air-Packed in Cans Radi	Vacuum-Packed in Cans Radi
Haddock fillets . . . .	250,000	150,000
Clam meats . . . . .	450,000	350,000
Pollock fillets . . . .	150,000	150,000
Ocean perch fillets . .	250,000	150,000
Cod fillets . . . . .	150,000	-

Details of the procedures used have been published by Connors et al (1964).

Species investigated to date are haddock, soft-shell clams, pollock (*Pollachius virens*), ocean perch (*Sebastes marinus*), and cod (*Gadus morhua*). The optimum dose data for those species are shown in table 1.

To determine acceptability, haddock fillets and clam meats were taste-tested by trained and untrained sensory panels. The results are shown in tables 2 and 3.

The results to date show that radiation with cobalt-60 gamma rays significantly extends the refrigerated storage life of haddock, pollock, ocean perch, and cod fillets and clam meats without creating objectionable changes in the organoleptic quality of the product.

The data in table 1 indicate that air-packed samples generally required a higher irradiation dose than did the vacuum-packed samples. This is probably explainable on the basis that the organism mainly responsible for spoilage requires an aerobic environment.

Table 2 - Average Organoleptic Scores Assigned to Irradiated Deep-Fat-Fried Haddock Fillets by Different Taste Panels				
Panel	No. in Panel	Storage Time at 33° F. Prior to Testing	Average 1/ Organoleptic Score of Treated Samples	Average 1/ Organoleptic Score of Control Samples
		Days		
Gloucester	12	15	8.0	2/
Mixed	45	15	8.4	5/
U.S. Army	19	60	7.5	8.0
U.S. Army	300	15	5.5	6.5
U.S. Army	300	30	5.6	6.1

1/A 9-point hedonic scale was used where: 9 - like extremely, 8 - like very much, 7 - like moderately, 6 - like slightly, 5 - neither like nor dislike, 4 - dislike slightly, 3 - dislike moderately, 2 - dislike very much, 1 - dislike extremely.

2/No controls were used in these tests, but previous experience indicates that controls would have received scores between 8 and 9.

Table 3 - Average Organoleptic Scores Assigned to Irradiated Deep-Fat-Fried Soft-Shell Clam Meats by Different Taste Panels

Panel	No. in Panel	Storage Time at 33° F. Prior to Testing	Average 1/ Organoleptic Score of Treated Samples
		Days	
Gloucester	12	15	7.8
Gloucester	12	30	7.7
Mixed	45	15	8.6
M.I.T.	?	15	6.0
M.I.T.	?	30	5.1

1/A 9-point hedonic scale was used where: 9 - like extremely, 8 - like very much, 7 - like moderately, 6 - like slightly, 5 - neither like nor dislike, 4 - dislike slightly, 3 - dislike moderately, 2 - dislike very much, 1 - dislike extremely.

The organoleptic test results show that the taste panel did not detect statistically significant quality differences between air-packed and vacuum-packed samples. However, comments by individuals gave evidence that air-packed clam meats were more tender than the vacuum-packed samples. With ocean perch fillets there were comments of rancidity in some air-packed samples, but this was not severe enough to be objectionable.

#### AMINO ACID AND B-VITAMIN STUDIES:

Haddock fillets and soft-shell clam meats were analyzed for total and free amino acids and for B-vitamins to determine the effects of radiation, cooking, and storage on those nutrients.

Analyses were made on unirradiated fresh samples, samples irradiated at their optimum dose level, samples irradiated at ten times their optimum dose level, stored samples, heat-processed samples, and samples which received a combination of treatments. The procedures used for the quantitative analyses and the results are reported by Brooke et al (1964).



Irradiation at the optimum dose levels did not significantly affect the amino acid and vitamin-B values of haddock fillets and clam meats. There was some loss of thiamine. But even when the samples were irradiated at a level ten times greater than the optimum dose, the nutrients were not affected to any greater degree than can be expected as a result of cooking or seasonal variations.

**FLAVOR AND ODOR STUDIES:** Because fishery products spoil relatively quickly and because quality deterioration is detectable in volatile components (as evidenced by bad odors and flavors), a project was started to study the volatile compounds in fish and shellfish.

Samples were diced and the volatile compounds were removed under high vacuum and condensed in a liquid nitrogen-cooled trap. The condensate was then heated and the vapors were made to flow into a transfer chamber of measured volume which was then connected to a gas chromatograph to permit analysis of the volatiles. Two gas chromatographs were available for this work. The instrument used for the early work was fitted with a Strontium-90 ionization detector. The retention column is fitted with a temperature programmer. The column temperature can be automatically increased from the temperature of dry ice ( $\sim -79^{\circ}\text{C}$ .) to about  $70^{\circ}\text{C}$ ., at a predetermined rate. The other gas chromatograph is equipped with a hydrogen flame detector and the retention column temperature can be automatically programmed from room temperature to  $500^{\circ}\text{C}$ .

Several retention columns were used, all with the same solid support--acid washed Chromosorb-W. The liquid phase or column coatings used were:

- (1) 2, 5, or 10% oxydipropionitrile.
- (2) 15 or 25% Carbowax 20M.
- (3) 5% butanediol succinate.
- (4) 20% ethylene glycol succinate.

Chromatograms resulting from the analyses were studied to note which compounds reflected effects of irradiation, heat-processing, storage, or a combination of treatments (see figure 1 for a typical chromatogram).

In addition to studying total volatiles, classes of compounds were studied separately. Carbonyl compounds were analyzed by two methods:

- (1) A modification of the Girard-T reagent method, described by Gaddis et al (1964) which permitted gas chromatography of isolated carbonyl compounds, was used to separate and identify individual carbonyls.
- (2) Total carbonyl compounds were determined by the 2,4-dinitrophenylhydrazine precipitation method described by Mendelsohn and Steinberg (1962).

Although more work needs to be done, enough evidence has been obtained to show that the volatile carbonyl compounds in clam meats may be useful indicators of quality and/or treatment of the product. Figure 1 represents a typical gas chromatogram of the concentrated volatile carbonyls in fresh raw clam meats. It is believed that this type of chromatogram can be used as a standard for identifying fresh clams, but more data are required before this can be established. The compounds have been identified by comparing their retention times with those of pure compounds on three separate columns. Similar chromatograms were obtained for the volatiles of cooked fresh clam meats, fresh raw irradiated clam meats, and nine-day-old raw clam meats. When the chromatograms were compared, it was found that irradiation at 350,000 rads and storage for 9 days affected carbonyl concentrations similarly.

Both variables caused large increases in peaks 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 15 and 16; a slight increase in peak 14; and no peaks were lost. By large increases, it is meant the peak areas were increased by a factor of five or more, and slight increases by a factor of two or less. Irradiation caused the appearance of 2 (possibly as much as 4) new small peaks.

Cooking caused a large increase in peaks 1, 2, 6, 11, 12, 13, and 15; moderate increases in 14 and 15; large decreases in 3, 4, and 7; a slight decrease in 9; and peak 5 was lost.

It is possible that carbonyl compounds may exist in quantities too small to detect which may account for the apparent appearance and disappearance of peaks in the chromatograms when the volume of a compound passes beyond the threshold of detectability.

The determinations of total carbonyls are presently being continued as a secondary quantitative method. It has value as a check on the results obtained with the gas chromatographic method.

Results in recent experiments indicate that the detectable volatile carbonyls disappear as the time of storage increases beyond 30 days, and that irradiation reduces the times required for carbonyls to reach their maximum concentration and their ultimate loss.

Sulfide compounds were studied by two separate methods:

- (1) A colorimetric method (1955) involving the production of methylene blue.
- (2) Sulfides were also studied using a modification of the Bassette method (1962). Gas chromatographic analyses for sulfides permitted identification of the individual compounds by comparing their retention times with retention times of known sulfides.

Briefly, the Bassette method involves separating a sample into two parts. One part is reacted with mercuric chloride which removes the sulfides from the sample mixture. When the two aliquots are individually chromatographed, the sulfide compounds in the unreacted aliquot can be determined by noting which of the peaks are missing in the chromatogram of the reacted sample.

Tentative identification of the unknown sulfides was made by the method of Baumann and Olund (1962) which related relative retention times of the compounds to their molecular weights.

The details of these experiments will appear in a series of papers which are presently being prepared for publication by staff members of the Gloucester Technological Laboratory.

Employing the quantitative methylene blue method, it was found that total sulfides in clam meats increase with storage. The irradiated samples did not show as rapid an increase in sulfides as did the unirradiated samples. Besides permitting one to follow the overall changes in total sulfides, this method also has value as a check on the results obtained by the gas chromatographic method. However, the method does not permit identification of the individual compounds.

Using the modified bassette gas chromatographic technique, five compounds have been tentatively identified. They are hydrogen sulfide, dimethyl sulfide, dimethyl disulfide, methyl mercaptan, and ethyl isopropyl sulfide.

**PRE- AND POST-IRRADIATION STUDIES:** Although it was necessary to use extremely fresh fish for the optimum dose determination studies, it was recognized that in commercial practice the radiation process would have to be applicable to fish one week or more out of the water. A project was undertaken to show the effects of the pre-irradiation quality of the product on its post-irradiation quality and shelf life.

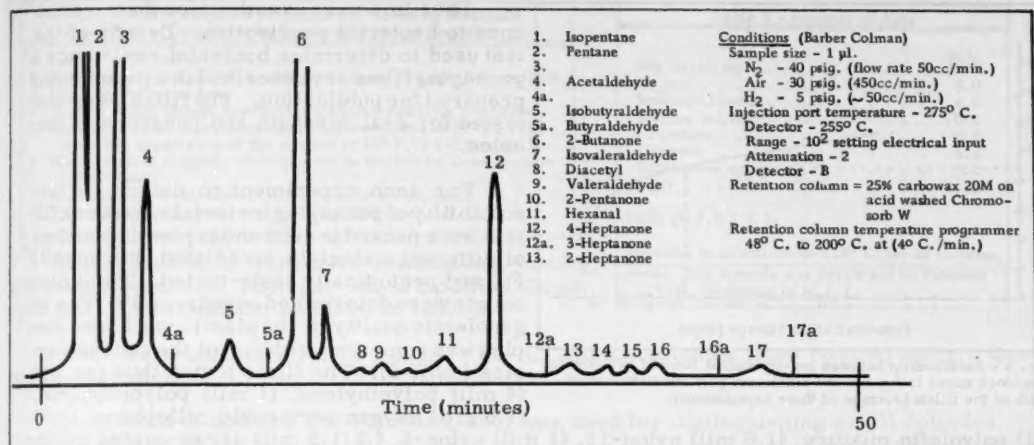


Fig. 2 - Gas chromatogram of concentrated volatile carbonyl compounds in raw, unirradiated clam meats held for two days at 34° F.

Table 4 - The Post-Irradiation Shelf Life at 34° F. of Air-Packed Skinless Fillets Cut from Haddock Iced for Different Periods Prior to Irradiation

Pre-Irradiation Iced Storage Days	Maximum Post-Irradiation Shelf Life			
	1st Exp.	2nd Exp.	3rd Exp.	Avg.
4	26	33	33	31
7	16	32	35	29
9	13	27	30	23
11	10	10	16	12
16 (spoiled)				

The very freshest haddock and haddock fillets(haddock was the first species studied) were brought into the laboratory and the fillets were immediately plate frozen at -40° F. and stored at -5° F. The fish were iced in large wooden boxes to simulate shipboard holding conditions. Periodically, some fish were withdrawn and filleted, and the fillets were canned and irradiated at the optimum dose and stored at 34° F. The fillets were organoleptically tested periodically until the onset of spoilage.

In the last haddock experiment, the samples were also analyzed for total plate counts.

The results of those experiments are shown in table 4 and figure 2.

The curve in figure 2 represents the averages of the data obtained in three separate experiments which are shown in table 4. From the curve it can be seen that when fish are held in ice for not longer than about nine days, a considerable post-irradiation shelf life can still be expected. However, as the pre-irradiation time is increased beyond nine days the post-irradiation shelf life is sharply reduced.

The difference in maximum post-irradiation values obtained in the three experiments shown in table 4 reflect differences in the original quality of the fish in each batch.

**PACKAGING STUDIES:** Because of the many advantages offered by flexible packaging materials, a study was initiated to determine the suitability of the available plastics to hold irradiated fish and shellfish.

Several films were chosen for study according to desirable properties as shown in table 7.

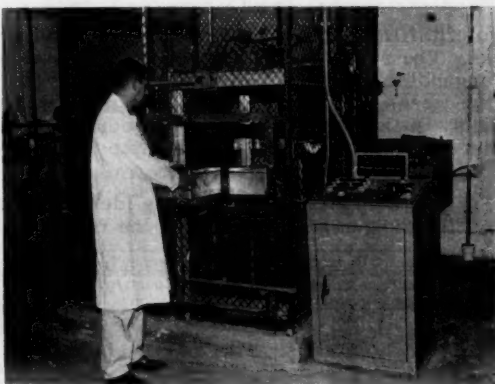


Fig. 3 - Loading 30-pound fillet tins on fast conveyor. Product will be transported through maze into the radiation cell for pasteurization.

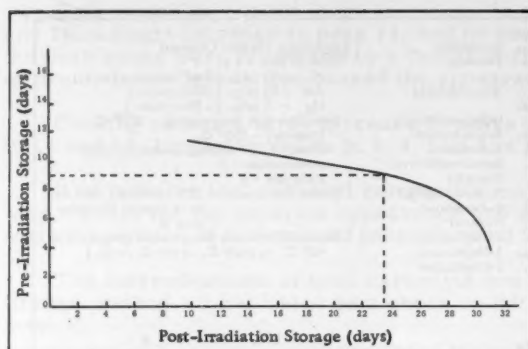


Fig. 4 - Relationship between pre-irradiation time of eviscerated haddock stored in ice and the maximum post-irradiation shelf life of the fillets (average of three experiments).

mil) polyolefin mixture, (1.6 mil) nylon-11, (1 mil) nylon-6, (.2/1.6 mil) saran-coated nylon-11, and (2 mil) polyolefin-coated polyester. A publication covering that work is presently being prepared.

All of the films tested were found to be impermeable to bacterial penetration under the conditions to which they were exposed. There is no recognized method for determining bacterial permeability of plastic materials; in fact, there is practically no published work available on the subject. The original method used for this work is being developed further and will be published as a suitable and reliable technique for determining the bacterial permeability of plastic packaging materials.

The films were found to be relatively free from pinholes and of sufficient seal strength.

Results of early experiments showed that the polyethylene, polypropylene, and the mixed polyolefin films did not protect the quality of the product for periods longer than two to three weeks. The results of later experiments with nylon-11 and polyester are shown in table 5, and the organoleptic data clearly indicate that those films were as suitable as the can for a period of four weeks. However, it will be noted that the bacterial numbers were lower in the canned product. It is expected that if the products were held for a longer period, the higher total plate counts in the plastic-packaged samples would be reflected in significantly lower organoleptic scores.

The data appear to support the idea that the quality loss in the stored product is a function of the oxygen permeability of the material in which it is contained. This is particularly true for pasteurized products with a surviving flora which has at least a partial dependence on oxygen.

Sample No.	Total Plate Counts/g Prior to Irradiation	Total Plate Counts/g After Irradiation	Percentage Reduction in Total Plate Count
1	83,000	450	99.5
2	170,000	200	99.9
3	180,000	450	99.7
4	100,000	990	99.0
5	100,000	1,200	99.0
6	1,300,000	2,200	99.8
7	5,500	50	99.1

Note: Values are averages of duplicates.

mine the reduction in bacteria as a result of the process and some of the data obtained are shown in table 6.

The films were examined for their resistance to bacterial penetration. Details of the test used to determine bacterial resistance of packaging films are described in a paper being prepared for publication. The films were also tested for seal strength and presence of pinholes.

For each experiment to determine the suitability of packaging materials, haddock fillets were packed in cans and in plastic pouches of different materials, irradiated, stored at 33° F., and periodically taste-tested. Total plate counts were determined concurrently. The organoleptic quality of the plastic-packaged samples was compared with that of the canned samples (table 5). The films tested thus far are (4 mil) polyethylene, (1 mil) polypropylene, (1.5 mil) oxygen permeable cellophane, (3.5)

Packaging Material	Average Organoleptic Scores <sup>1</sup>			Total Plate Counts/g (x10 <sup>6</sup> )		
	Experiment No.			Experiment No.		
	1	2	3	1	2	3
Nylon-11	2.0	2.2	2.3	94.0	1.6	12.0
Saran-coated Nylon-11	2.0	2.1	2.7	1.1	61.0	17.0
Polyolefin-coated polyester	2.2	2.0	2.2	17.0	18.0	3.0
Metal can	2.1	2.4	2.3	1.9	24.0	2.8

<sup>1</sup>/A 5-point scale was used where: 5 - excellent, 4 - very good, 3 - good, 2 - fair, 1 - poor.

**MICROBIOLOGY:** Routinely, whenever a batch of fish was brought into the laboratory at the start of a storage study, initial total plate counts were made. Total plate counts were also made after irradiation to deter-



Table 7 - List of Required Properties for Packaging Materials to be Used as Containers for Irradiated Fish and Shellfish

1. Must be approved by the F.D.A.
2. Must be easily sealed, preferably by ordinary heat-sealing methods.
3. Must prevent water loss.
4. Must be strong enough to withstand moderate handling conditions.
5. Must have a life expectancy of at least two months at 32° F. (The shelf life expectancy of the product at 33° F. is 1-2 months.)
6. Must maintain integrity when exposed to irradiation doses of up to 500,000 rads.
7. Must not impart off-odors or off-flavors to the product.
8. Must prevent microbial contamination of the product.

Standard methods were used in sampling, plating, and colony counting. The agar was a modified Egon agar and its composition is shown in table 8.

Plates were incubated for five days at 20° C. and the colonies were counted using a Quebec colony counter.

The method of Solberg and Proctor (1960) was used for distinguishing small colonies.

Table 6 lists some of the total plate count data obtained from haddock fillet samples, and for that species a radiation dose of 250,000 rads apparently reduced the bacterial numbers by at least 99 percent.

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Created in 1849, the Department of the Interior—a department of conservation—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

Table 8 - Formula of Agar

	g/l
BBL trypticase	15.0
Phytone	5.0
Sodium chloride	4.0
Sodium sulphite	0.2
L. cystine	0.7
Dextrose	5.5
Bacto yeast agar	5.0
Agar	15.0

Final pH 7.0 ± 0.1.

Sterilized in autoclave @ 118° C. for 15 minutes.

Note: This formula was developed by Professor J.T.R. Nickerson of M.I.T.

## CONSTRUCTION AND OPERATION OF THE "COBB" PELAGIC TRAWL (1964)

By Richard L. McNeely,\* Leonard J. Johnson,\*\* and Charles D. Gill\*\*\*

### SUMMARY

1. The "Cobb" pelagic trawl has caught large quantities of Pacific hake while being towed through the water at a speed of only 2 to 3 knots.
2. The quadruple armored, six-conductor towing cable has withstood repeated tows under test fishing conditions.
3. Accurate depth positioning of the trawl was essential for making repeated large catches of midwater fish.
4. Trawl depth was easily controlled by changing engine speed.
5. The "Cobb" pelagic trawl was effectively operated by a 73-foot Pacific Coast commercial trawler.

### INTRODUCTION

During 1964, substantial catches of Pacific hake (*Merluccius productus*), Pacific ocean perch (*Sebastes alutus*), and anchovy (*Engraulis mordax*) were made by the U. S. Bureau of Commercial Fisheries' 93-foot research vessel John N. Cobb and the chartered 73-foot commercial trawler St. Michael using experimental "Cobb" pelagic trawls (fig. 1). Catches up to 30 tons of mostly Pacific hake have been made in a single 30-minute tow (figs. 11, 12 and 13).

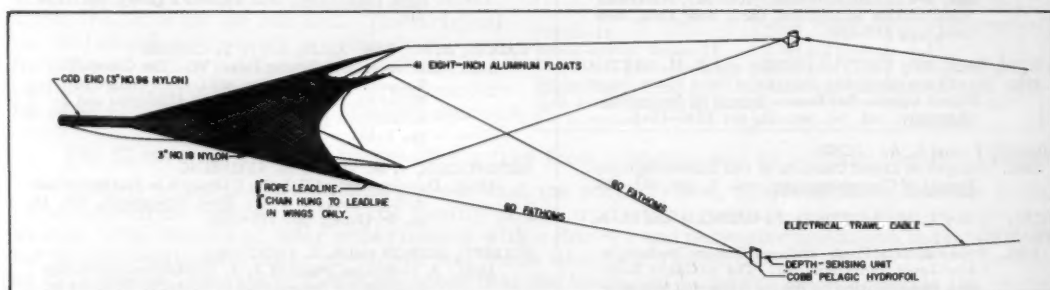


Fig. 1 - "Cobb" pelagic trawl (1964).

The "Cobb" pelagic trawl has been under development since 1961 at the Bureau's Exploratory Fishing and Gear Research Base in Seattle, Wash. (Alverson 1962). The details of construction have primarily resulted from modifications shown to be necessary during direct underwater observation by SCUBA-equipped scientists traveling along with the gear (McNeely 1963). Excellent catches taken during the past year show that a large net towed at 2 to 3 knots would be effective in harvesting midwater species.

Consistently good catches of hake by the St. Michael during gear research experiments and by the John N. Cobb during pelagic explorations have resulted in an unusually large number of requests for information concerning details of construction and operation of the new gear. This report will satisfy such requests.

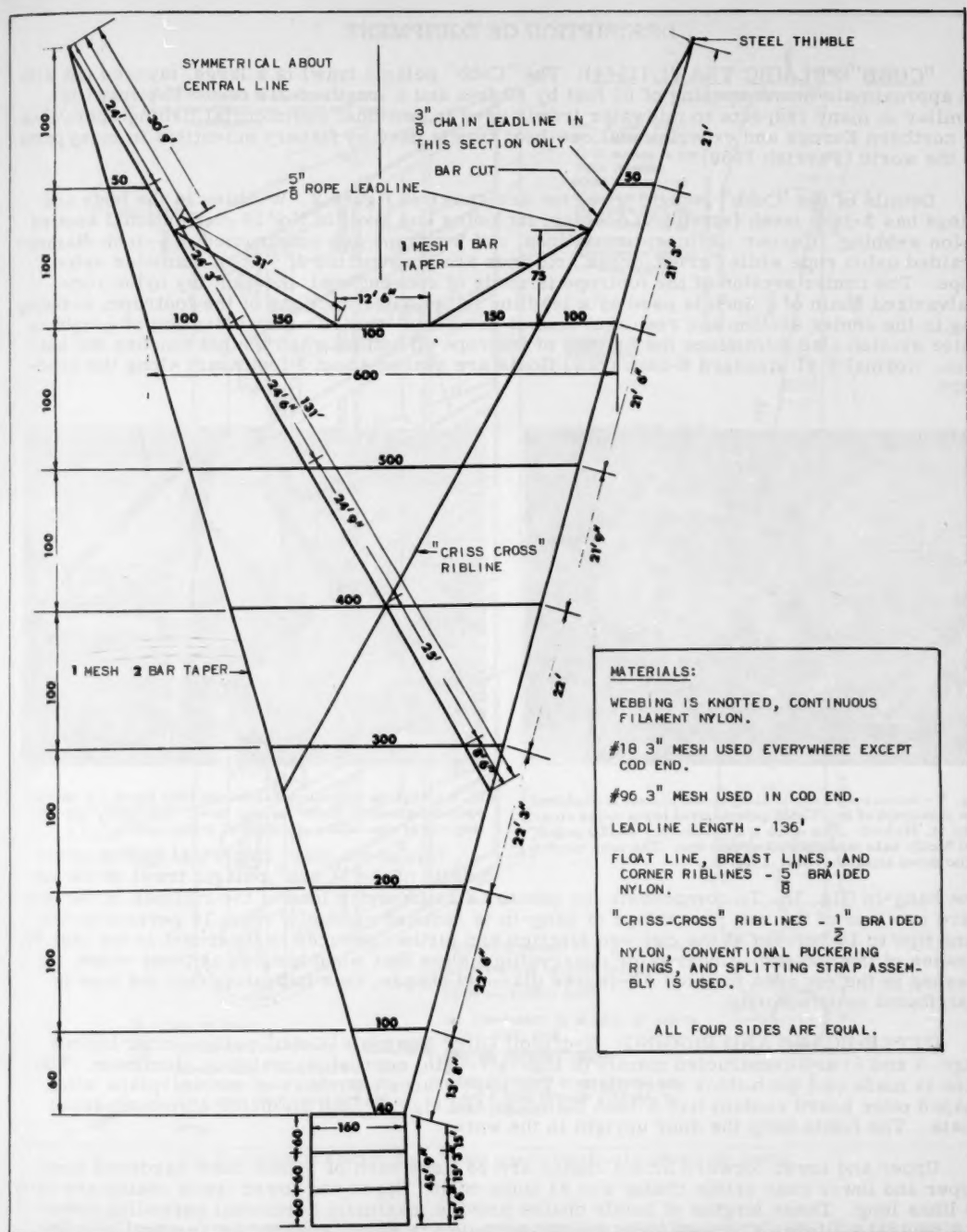
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U. S. DEPARTMENT OF THE INTERIOR  
Fish and Wildlife Service  
Sep. No. 743



## DESCRIPTION OF EQUIPMENT

**"COBB" PELAGIC TRAWL (1964):** The "Cobb" pelagic trawl is a large, tapered net with an approximate mouth opening of 60 feet by 60 feet and a length of 215 feet. The trawl is similar in many respects to midwater trawls used in two-boat commercial fishing operations in northern Europe and experimental one-boat trawls used by fishery scientists in many parts of the world (Parrish 1959).

Details of the "Cobb" pelagic trawl net are shown in figure 2. Webbing in the body and wings has 3-inch mesh (stretched opening, including one knot) of No. 18 conventional knotted nylon webbing. Corner riblines, breastlines, and headrope are constructed of  $\frac{3}{8}$ -inch diameter braided nylon rope while "criss-cross" riblines are constructed of  $\frac{1}{2}$ -inch diameter nylon rope. The center section of the footrope is made of conventional, medium lay nylon rope. Galvanized chain of  $\frac{3}{8}$ -inch is used as a leadline in the outer sections of the footrope, reducing sag in the center section and resultant loss of horizontal spread. Concentration of weight in outer section also minimizes the amount of footrope on bottom when the net touches the bottom. Normally 41 standard 8-inch trawl floats are spaced about 3 feet apart along the headrope.

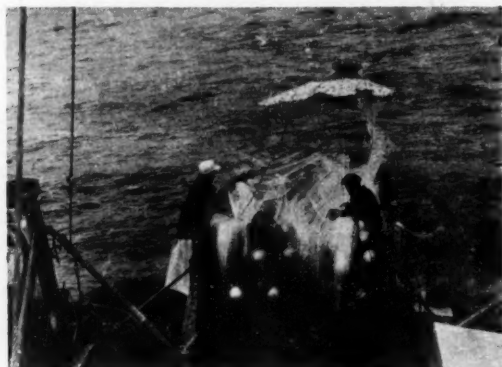


Fig. 3 - Incremental hang-in along corner riblines is illustrated in photograph of the "Cobb" pelagic trawl being reeled aboard the St. Michael. This catch is approximately 42,000 pounds of Pacific hake taken in a 60-minute tow. The same catch is also shown alongside vessel in fig. 12.

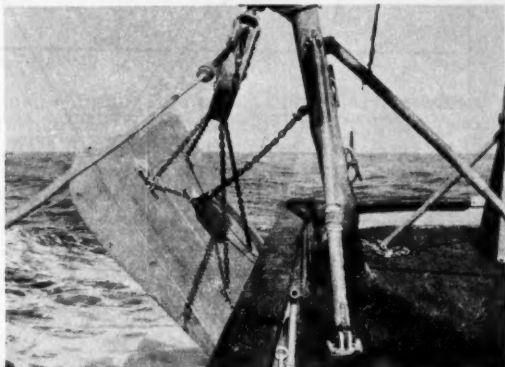


Fig. 4 - Airplane wing-shaped aluminum otter boards are used to open experimental "Cobb" pelagic trawl. Also note depth-sensing unit at termination of electrical towing cable.

One of the more important construction details of the "Cobb" pelagic trawl is the ribline hang-in (fig. 3). To compensate for greater stretch under load of the riblines in the forward sections of the net, percentage of hang-in is reduced gradually from 16 percent at the wing tips to 10 percent at the cod-end junction and further reduced to 0 percent in the last 60 meshes of the cod end. Underwater observations show that when hung-in at these rates, all meshes in the net open to about 60-degree diamond shapes, thus indicating that the load is distributed satisfactorily.

**OTTER BOARD AND RIGGING: Hydrofoil Otter Boards:** "Cobb" pelagic otter boards (figs. 4 and 5) are constructed mainly of high-strength, corrosion-resistant aluminum. The shoe is made of  $\frac{1}{2}$ -inch thick steel plate. The upper three chambers of each airplane wing-shaped otter board contain five 8-inch diameter and eight 5-inch diameter aluminum trawl floats. The floats keep the door upright in the water.

Upper and lower forward bridle chains are 25 links each of  $\frac{3}{8}$ -inch case-hardened steel. Upper and lower rear bridle chains are 41 links each. Upper and lower trace chains are each 86 links long. These lengths of bridle chains provide maximum horizontal spreading power in a neutral attitude. Changes from neutral attitude are easily affected by removal of a few links from either upper or lower trace chains depending on the diving or climbing attitude desired. Any change from neutral attitude causes a loss of horizontal spreading power.



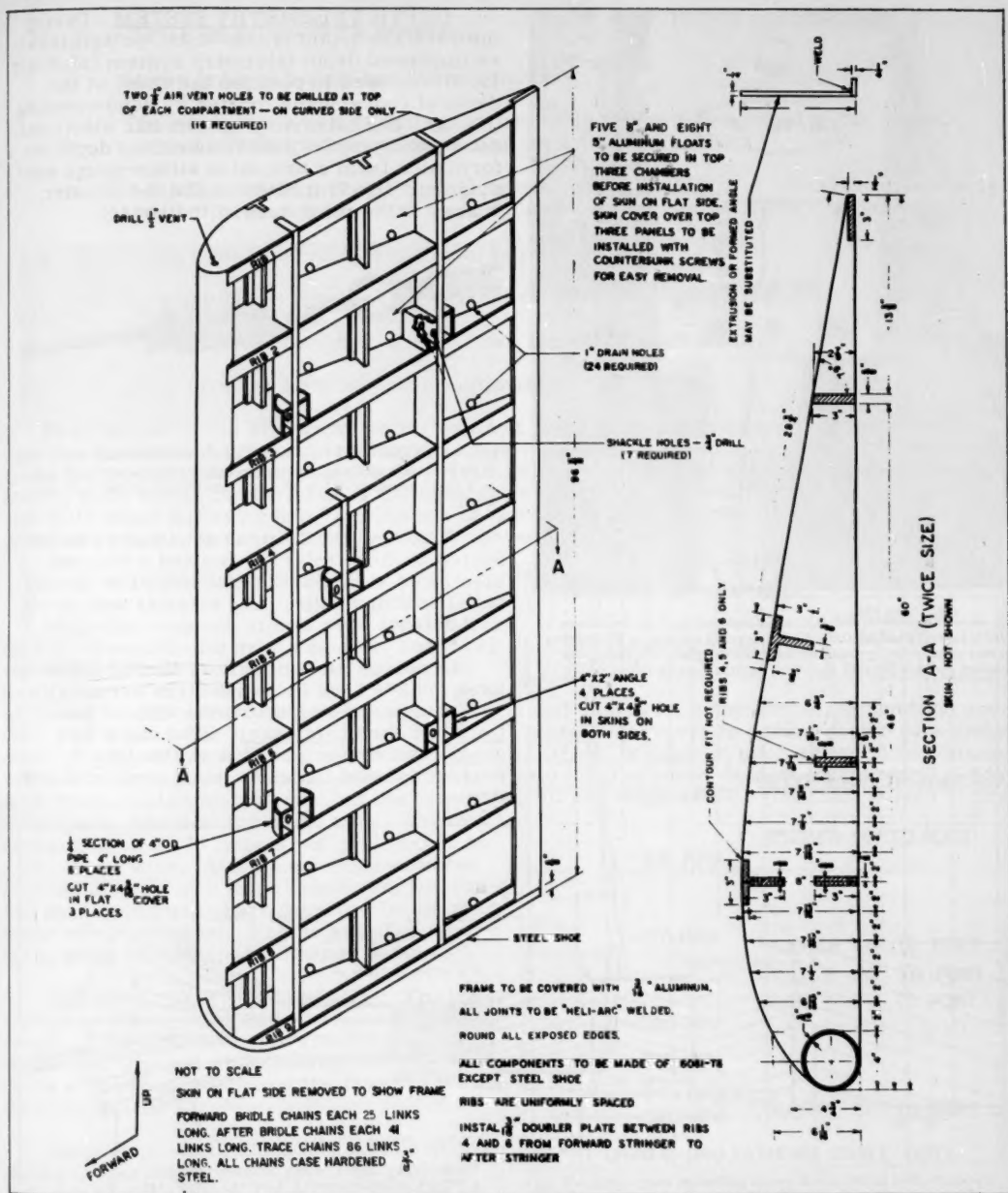


Fig. 5 - Construction details of the "Cobb" pelagic otter board (starboard side shown).

Sweep-lines: A conventional bridle system connects the net to the hydrofoils. Bridle sweep-lines are 60 fathoms long and are made of  $\frac{1}{2}$ -inch diameter steel cable.

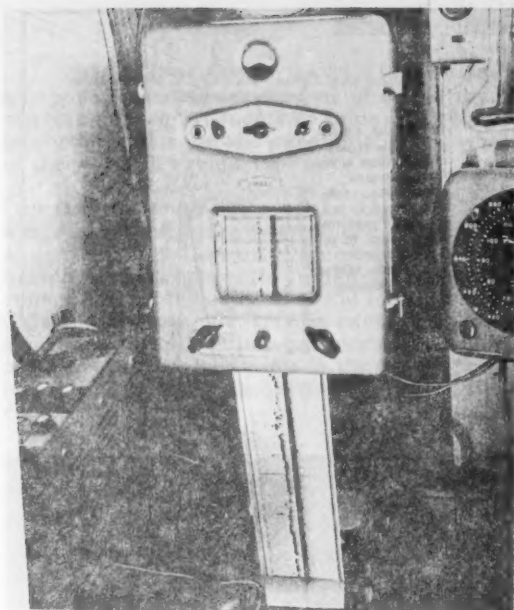


Fig. 6 - Echogram of fish concentration shows 4- to 6-fathom thick layer approximately 10 fathoms off bottom in 62-fathom water depth. Drag made while this echogram was being recorded yielded 50,000 pounds of mostly Pacific hake.

layer opposed helical-wound steel armor (fig. 8). The new cables performed without fault during a 10-month period of use by the John N. Cobb and the St. Michael. (The cable was transferred from the John N. Cobb to the St. Michael and later reinstalled on the John N. Cobb.) Contributing factors to the satisfactory performance of the cable when compared with earlier cables (McNeely 1961) include the following:

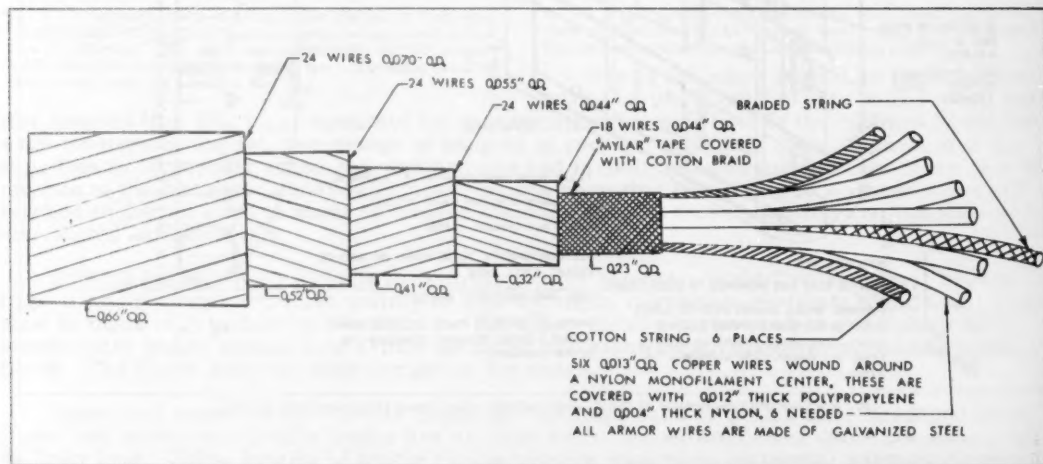


Fig. 8 - Scale drawing of the electrical towing cable shows the 4 layers of steel armor and 6 insulated conductors.

**DEPTH TELEMETRY SYSTEM:** During the 1964 sea trials of the "Cobb" pelagic trawl, an improved depth telemetry system (McNeely 1958) was used to position the trawl at the depth of fish schools located by echo-sounding (fig. 6). The telemetry system had electrical core towing cables that transmitted depth information from a precision strain-gauge sensing unit (fig. 7) located on the net or otter boards to the pilothouse of the vessel.

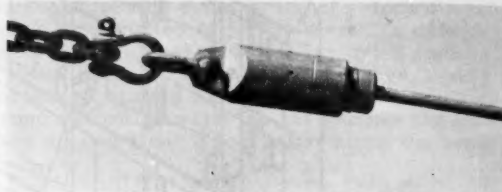


Fig. 7 - Stainless steel case on end of electrical towing cable contains precision strain-gauge type pressure transducer which serves as a depth sensor to allow accurate positioning of the midwater trawl.

A control panel in the pilothouse was connected to the winch plug-ins and a two-pen electronic strip chart recorder. The control panel contains calibrating circuits and on-off switches.

Improved electrical core towing cables used in 1964 have six conductors and four-

## 1. Four-layer steel armor construction.

- a. Strain induced torque has been reduced.
- b. The new cable has a 47,000-pound breaking strength compared to the 19,000-pound breaking strength of earlier experimental cables.
- c. A thicker shield protects the electrical core from physical damage, particularly at the point of emergence from the sensing unit cable termination socket.

## 2. Electrical core construction has been improved.

- a. Conductors are made of six twisted strands of 28-gauge copper.
- b. Conductor insulation consists of two layers of tough plastic.
- c. Core size has been kept to a minimum.

Termination of the electrical towing cable at the sensing unit was accomplished using either molten babbitt or epoxy to secure a short section of unwound and curled steel strands inside the termination socket (McNeely 1960). Bending and curling the four layers of steel strands to fit within the confines of the sensing unit termination socket was accomplished with little more difficulty than termination of two-layer cable. Continuity at the winch was provided by quick-disconnect, waterproof plug-ins.

## OPERATION OF GEAR

After fish concentrations were located by the echo-sounder, the gear was set. The trawl and sweeplines were first unwound from the trawling net reel (Wathne 1959). The hydrofoil trawl boards were then hooked up, and the cable payed out from the towing winch. Cable meters attached to the towing warps were used to indicate the amount of cable unwound from each drum. Cable meters enabled the crew to let out both cables at the same rate. The trawl, sweeplines, and 100 fathoms of cable could be set in 10 minutes. After the rubber-covered plug-ins at the winch were connected, the control panel and strip chart recorder in the pilot-house were turned on. Engine speed was varied to bring the net to the desired depth.

**CONTROL OF TRAWL DEPTH:** The trawl depth was easily changed by varying engine speed. If the echo-sounder showed the depth of fish had changed while towing, the engine speed was adjusted to bring the trawl to the desired depth (fig. 9).

Even large depth changes could be accompanied by varying engine speed. In a recent test aboard the John N. Cobb, 200 fathoms of cable were unwound and the trawl towed at an engine speed of 260 r.p.m. The net was at 75 fathoms. The engine speed was then increased to 310 r.p.m. The net rose 25 fathoms in 10 minutes. The engine speed was then dropped to 210 r.p.m. causing the net to drop to 100 fathoms. This depth change took 15 minutes.

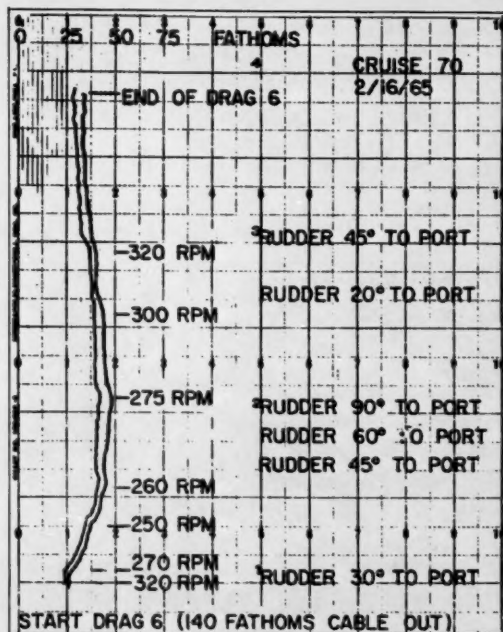


Fig. 9 - Strip-chart recording shows the depth of both starboard and port hydrofoil otter boards. The starboard hydrofoil is nearer the surface because the net banks like an airplane as the boat turns. When the turn becomes tighter the net banks more. The trawl rose in the water as engine speed was increased.

At the end of the tow, the net was hauled out. First, plug-ins at the winch were disconnected and the cable wound in. If the net was being towed near bottom, the engine was run at full speed for about 10 minutes to bring the net well clear of the bottom before reeling in cable. When the hydrofoils were brought up to the davits, idler chains were disconnected from the hydrofoils and connected to the net reel. Sweepstakes and net were then wound onto the net reel. Two crewmen guided the sweepstakes and net evenly onto the reel. About 40 minutes were required to wind in 150 fathoms of cable, sweepstakes, and net.



Fig. 10 - Fish caught during sea trials of the "Cobb" pelagic trawl are brought aboard to determine the weight of catches (dynamometers were used to weight each "split"), to determine species composition, and to obtain biological information on hake.

#### DIFFICULTIES ENCOUNTERED

Extensive testing of the trawl, hydrofoil otter boards, and depth-telemetry system revealed several deficiencies. Many fish gilled just ahead of the cod end when small fish were encountered. Webbing ripped on contact with rough bottom. Neither boat used was able to hold a course when towing across a strong tide.



Fig. 12 - A catch of 42,000 pounds of Pacific hake taken in a 60-minute tow by chartered commercial trawler St. Michael using an experimental "Cobb" pelagic trawl. Fish on deck and those in net were taken in same tow.

Large catches were swung around to the side of the vessel and brought aboard in repeated "splits." Proficiency in estimating the weight of catches was gained through use of a precision dynamometer to weigh each split after noting the size of the bag of fish alongside the vessel (fig. 10).



Fig. 11 - A catch of 60,000 pounds of Pacific hake taken in a 30-minute tow by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb using an experimental "Cobb" pelagic trawl.



Fig. 13 - Six-thousand-pound catch of rockfish (mainly Pacific ocean perch) in cod end of "Cobb" pelagic trawl. Meshes of cod end are 3 inches (stretched measure). Note conventional splitting stap assembly.

Also, electrical connections at the winch and inside the sensor housing failed. Changes in the telemetry system were made to eliminate the cause of such failures.

### REASONS FOR LARGE CATCHES IN 1964

Larger catches obtained during 1964 sea trials compared to those taken in 1962 and 1963 sea trials are probably due to two important factors. First, during recent trials, the trawl was usually fished only after the echo-sounder indicated moderate to heavy concentrations of fish were present. In 1962 and 1963 the trawl was usually set without regard to size of fish concentrations indicated by the echo-sounder. The second factor is the improved telemetry system, which more accurately positions the depth of the trawl.

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### TROUT EGGS EXCHANGED BETWEEN UNITED STATES AND YUGOSLAVIA

The hatching of about 90,000 to 100,000 Ohrid trout eggs, received from Yugoslavia earlier this year in an exchange of fish eggs with that country, was reported by the U. S. Bureau of Sport Fisheries and Wildlife National Fish Hatchery at Manchester, Iowa. In exchange, an equivalent number of Donaldson strain rainbow trout eggs from the United States were flown to Yugoslavia.

United States biologists say the eggs from Yugoslavia were quite large and exceptionally well colored, and since hatching, the "fry" were reported strong and vigorous. The imported eggs were divided between the Bureau's National Fish Hatchery at Manchester, Iowa, and the State Hatchery at Lanesboro, Minn. Some of the Ohrid trout will be retained at the Manchester Hatchery as brood fish and others will be stocked in suitable lakes on an experimental basis.

The Ohrid trout, named for a lake in Yugoslavia, normally spawn on gravel beaches and do not require flowing water as do many other trout. For that reason, researchers believe they may prove useful for stocking some lakes in the United States. Adult Ohrid trout sometimes attain a weight of 8 pounds.





# TRENDS AND DEVELOPMENTS

## Alaska

### BRISTOL BAY SALMON RUN NEARS RECORD:

The 1965 season will go on record as a bonanza year in the Bristol Bay sockeye salmon fishery. By July 26, the return of sockeye salmon to Bristol Bay this season was approximately 52 million fish, according to preliminary catch and escapement data. Inclusion of the estimated high-seas catch of Bristol Bay red salmon raises the total to 60 million.

The escapement to all Bristol Bay rivers amounted to 28 million fish with escapements to the main river as follows: Kvichak, 23.8 million; Egegik, 1.4 million; Ugashik, 817,000; Naknek, 720,500; Wood River, 674,000.

Because of a lack of cans, virtually all canning operations ceased before July 26, with many operators calling a halt to work the week before. The total catch reached 23.7 million sockeye salmon, just one million fish short of the record catch of 24.7 million established in 1938. But because of the small size of the sockeye salmon and the reduction in gill-net mesh size, the case pack of 1.4 million fell well below the 1938 record pack of 1.8 million cases. This has been the first year since 1948 that the Bristol Bay red salmon pack has been greater than one million cases. Owing largely to the preponderance of 2-ocean sockeye salmon and the smaller mesh size, the yield ran approximately  $16\frac{1}{2}$  fish per case.

There were 2,680 units of gear registered to fish the Bay during the 1965 season. About 1,900 of these were drift boats, the remainder set nets. Limits of 2,000 to 2,500 salmon per boat per day were imposed for a period of nearly three weeks beginning June 30.

The dominant age class for the three districts on the east side was the sockeye salmon arising from the 1960 spawning. Practically all of the 40 million sockeye returning

to the Kvichak were of that age group. Of interest is the large return (more than 45 million) from the 1960 Kvichak escapement of 14.5 million spawners. It remains to be seen whether this year's large run resulted from a disproportionate return of 2-ocean sockeye salmon or whether a respectable showing of 63 fish may be expected in next year's run.

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### SOCKEYE SALMON DISTRIBUTION PATTERN IN BRISTOL BAY AREA STUDIED:

Several rivers flowing into Bristol Bay were as red this past summer as the sockeye salmon found in them. But the red color was introduced by fishery scientists of the U. S. Bureau of Commercial Fisheries field station at King Salmon, Alaska, to trace the offshore movement of the various river waters flowing into Bristol Bay. The influence of the river waters on salmon distribution was noted. The red dye (Rhodamine B) does not last long.

The Bureau's research biologist stationed at King Salmon said, "These studies are being carried out to determine how well the various rivers such as the Naknek, Kvichak, Egegik, and Ugashik maintain their identity in the waters of Bristol Bay and how this might control the distribution and behavior of the young and adult red salmon in the Bay."

If the rivers maintain a definite course through the Bay, the salmon may identify their home stream far out into the bay and "home" on it back to their parent stream. They orient on their home stream by the sense of smell, scientists say, using their highly sensitive olfactory glands. But where do they come under the influence of their home stream? Is it 30, 40, or 50 miles out in the Bay? The tests being made may tell. (This is the "home stream theory"--salmon detect their home stream and are guided

to the natal gravel.) So the rivers flowing in a discrete course through the Bay may control the distribution and behavior of adult salmon that are coming back to spawn in that particular river.

The dye studies have shown that the Naknek River follows a definite course in the Bay. It can be recognized at least 12 miles out in Kvichak Bay and probably farther. The route of the river water will be matched with the known route of the salmon. It then can be determined if the distribution of the river water controls the salmon.

Scientists would also like to answer the following questions: Does the river water control the distribution of the young fish going to sea? Does the river water follow certain courses through commercial fishing areas? If so, does it control the distribution of fish? To what extent is the distribution of river waters massed, modified or mixed by winds and storms? This information is important in the management of the commercial fisheries by the State because the distribution of river waters may determine stocks of red salmon in the commercial fishery and their destination for particular rivers flowing into Bristol Bay.

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#### FOREIGN FISHING ACTIVITY OFF ALASKA, JULY 1965:

U.S.S.R.: A slight decline in the Soviet trawling fleets in late June and early July was followed by a moderate increase in trawlers about the middle of July. Major Soviet trawling efforts were still centered in the Gulf of Alaska throughout July. A small fleet of 5 to 8 trawlers supported by a few reefers operated off Southeast Alaska from near Cape Ommaney to Cross Sound. Included in that fleet was the small group of vessels which fished off the Pacific Northwest Coast in June.

The area off Yakutat Bay once again in late July became the center of Soviet trawling. A fleet of about 55 trawlers, 13 reefers, and various support vessels were seen between Dry Bay and Icy Bay. Large quantities of ocean perch were observed on the decks of many of the trawlers and processing vessels.

With the buildup of Soviet trawling off Yakutat Bay, the fleet on Portlock Bank east



Fig. 1 - Soviet trawler hauling net containing Pacific ocean perch.

of Kodiak was reduced. By the end of July, the fleet on Portlock was estimated to include 20 trawlers, three reefers, and various support vessels.

The Soviet ocean perch fishery on Albacross Bank, which began with a small fleet in mid-June, was short lived and the area was abandoned by mid-July.

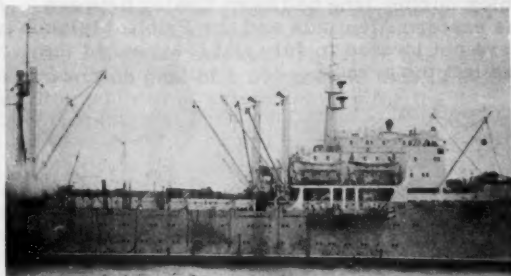


Fig. 2 - Soviet king crab factoryship Andrei Zakharov.

In the central and eastern Aleutians, generally near Seguam Pass, the Soviets maintained a sizable trawling fleet throughout July. That fleet averaged about 20 to 25 trawlers, including some 10 to 12 BMRT factory trawlers, accompanied by a few reefers and serviced intermittently by support vessels. Another smaller trawling fleet of about 10 trawlers, including several additional factory trawlers, was active in the western Aleutians throughout the month.

Indications in June were that the three Soviet king crab fleets would leave the Alaska area about July 1. Apparently those indications proved accurate for the Soviet crab

vessels were not sighted since the first day of July.

During early July the Soviets apparently abandoned their shrimp fishery, for all the SRT-M trawlers formerly fishing shrimp were located with ocean perch fleets. But in late July several of the SRT-M trawlers were again shrimping near Lighthouse Rocks east of the Shumagin Islands and it was estimated there then were about 5 SRT-M's and a reefer again engaged in the shrimp fishery.

Increased Soviet whaling activity was evident during July and it was believed there were three whaling fleets operating near Alaska. They were the factoryships Aleut, Dalnii Vostok, and Vladivostok, each accompanied by about 9 whale killers. Those fleets apparently worked mainly from the western Gulf of Alaska along the Aleutian Island Chain.

Japan: The Chichibu Maru and her fleet of 12 trawlers fishing for ocean perch and flatfish were not reported during July. But it was believed they were still operating in the western Aleutians or might have left the Alaska area. The two Japanese factory trawlers which during June had been fishing between the eastern Aleutians and the Pribilof Islands were not located in July and it appeared they had left the area.

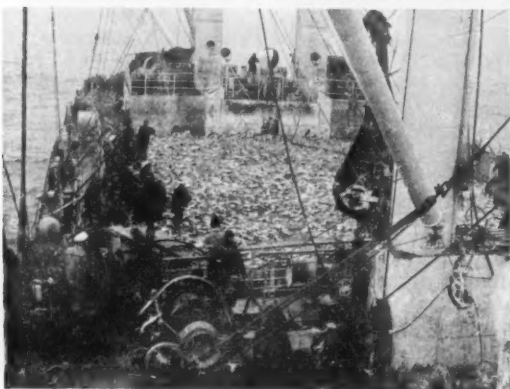


Fig. 3 - Japanese trawler in the Bering Sea with a deckload of flatfish.

Of the 23 vessels licensed by the Japanese Fisheries Agency to operate in the Gulf of Alaska fisheries in 1965, 10 had been in the area by the end of July. Those vessels, which consisted of 4 factory trawlers, 5 smaller catcher trawlers, and 1 processing reefer,

fished mainly on Albatross and Portlock Banks near Kodiak taking primarily Pacific ocean perch.



Fig. 4 - Crab boats leaving Japanese king crab factoryship in Bering Sea.

The 3 Japanese fish-meal fleets operated throughout July roughly 100 miles northwest of the Pribilof Islands. Catches observed aboard the factoryships consisted of about 70 to 75 percent Alaska pollock, with the remainder mainly flounder and sole.

During July the factoryship Einen Maru and her 15 trawlers remained on the shrimping grounds just north of the Pribilof Islands.



Fig. 5 - A large catch of crabs on the deck of a Japanese king crab mothership.

Shortly after withdrawal of the Soviet king crab fleets in early July, the Japanese Tokei Maru fleet left the area east of the Pribilofs and returned to the more typical grounds on outer Bristol Bay. The Tokei and the Tainichi Maru fleets remained on the outer Bristol Bay grounds the entire month.

The 11 Japanese high-seas salmon fleets remained well west of the International North



Pacific Fisheries Convention (INPFC) salmon abstention line (175° W.) generally throughout July. Japanese sources reported the fleets were expected to reach their catch quotas by the end of July and return to Japan in early August.

All three Japanese whaling fleets were active off Alaska during July and ranged from near Dixon Entrance off Southeast Alaska to the western Aleutians.

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#### JAPANESE KING CRAB RESEARCH IN BERING SEA:

Biologists of the U. S. Bureau of Commercial Fisheries visited the Japanese research trawler Kumamoto Maru which in July was engaged in trawling and bottom sampling in the Bering Sea at over 100 locations on a grid. About 5,000 male crab caught at those locations were being tagged and released to study migration and growth, and obtain life history data. Size frequencies of the commercial catch also were being collected.

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#### JAPANESE CRAB CONSERVATION MEASURES:

It was noted that the Japanese Fisheries Agency inspector aboard the vessel Tainichi Maru favors good conservation and directed the fishing fleet to change fishing locations when the catch of female crab reached 20 percent of the catch. A special net designed for easy removal of crab is used when the catch of females falls below 20 percent of the total catch.

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#### SOVIET SCIENTISTS OBSERVE U. S. KING CRAB RESEARCH:

Soviet king crab biologists visited the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John R. Manning on July 11. They observed the Bureau's king crab research and commercial fishing and processing activities in the Shumagin Islands area. During their visit, 2,459 king crab were tagged in study areas located off the Shumagin Islands and 3 crab-processing plants were visited to arrange for tag recoveries. An additional 370 crabs were sampled from commercial landings at Sand Point. The Soviets participated in the daily sampling work and during the visit, a mutual relationship de-

veloped between the Soviet and United States scientists, crew members, and fishermen and industry personnel. The Soviets also spent a day aboard the commercial fishing vessel Marine View.

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#### SALMON CAVIAR INDUSTRY DEVELOPING IN ALASKA:

For many years salmon roe has been considered an almost worthless byproduct of the salmon industry. The colorful pink or bright red eggs were usually discarded with the offal and dumped back into the sea. Within the last several years, however, salmon roe has received an increasing amount of attention--first as bait and more recently as salmon caviar.

In 1964, the production of salmon eggs for bait totaled about 1.5 million pounds with a wholesale value of over \$300,000. Salmon caviar production was over 850,000 pounds with a wholesale value of approximately \$750,000.

The new caviar industry has come about largely through the efforts of a Japanese firm which specializes in Alaska products for the Japanese market. The firm has set a production goal of 1,000 metric tons (2.2 million pounds) of salmon caviar for the 1965 season.

The price paid canneries for fresh salmon roe is 9 cents a pound, with the Japanese firm furnishing the labor for extracting the eggs. The firm has employed only Japanese nationals who have had extensive training in the caviar-making process. However, the firm has expressed interest in training native Alaskans to do the work. The training would extend over a period of about four seasons at which time the trainee would be considered skilled and would receive commensurate pay.



#### Alaska Fisheries Investigations

##### MIGRATION PATTERNS IN 1965 OF JUVENILE PINK SALMON:

A cruise during July 12-20, 1965, by the U. S. Bureau of Commercial Fisheries research vessels Heron and Blueboat observed and sampled juvenile pink and chum salmon

in all major summer schooling areas in Southeastern Alaska. Excellent weather conditions permitted additional observations around Cape Adington. Highlights included: (1) average fish size continued to be less than that observed in 1964, especially in the northern areas; (2) migrations to summer nurseries were later, especially in northern areas; (3) the largest pink salmon caught were found inside of Cape Muzon and may be of Canadian origin; (4) the largest summer nursery area observed so far in Southeastern Alaska includes most of Clarence Strait from Kasaan Bay to Snow Pass. Concentrations observed at Snow Pass indicated the beginning of a major migration by those fish into Summer Strait. Absence of juveniles around Cape Adington indicated a more northerly migration route for west coast of Prince of Wales Island pink and chum salmon to the Warren Island nursery area.



## California

### COD-END TRAWL TESTS AND HALIBUT-TAGGING PROJECT:

M/V "Alaska" Cruises 65-A-1 (February 24-March 5, 1965) and 65-A-4 (May 11-26): The objectives of these cruises by the California Department of Fish and Game research vessel Alaska on the Ventura Flats and Santa Barbara area were to: (1) compare fish retention in 5½- and 7½-inch mesh cod ends and 5- and 7½-inch cod ends, (2) tag California halibut (Paralichthys californicus) longer than 500 millimeters (19.7 inches), and (3) collect supplemental age and growth information on larger fish.

All fish retained in the cod ends, except elasmobranchs, were measured. They consisted of 573 hornyhead turbot (Pleuronichthys verticalis), 442 English sole (Parophrys vetulus), 952 California halibut, and many less important species.

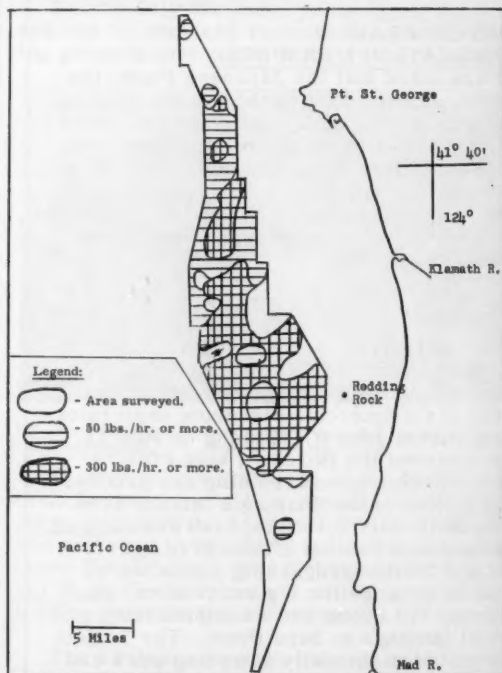
A well-defined selectivity of the various cod ends tested during the cruise showed that the calculated average weight of a 549 millimeter (21.6 inches) fish is 3.77 pounds which represents an undersized fish that cannot be marketed legally. The 297 California halibut longer than 500 millimeters that were tagged on the cruise averaged 6½ pounds each. Age and growth information was collected from 163 large fish up to 45 pounds.

A scientist from the "Institut für Film und Bild," Munich, Germany, who accompanied the cruise, exposed 1,200 feet of 16-mm. color film on trawling activities during the cruise.

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### SURVEY OF SHRIMP RESOURCES IN COASTAL WATERS CONTINUED:

M/V "Alaska" Cruise 65-A-5-Shrimp (June 1-July 1, 1965): The objectives of this cruise by the California Department of Fish and Game research vessel Alaska in the coastal waters from the Oregon border to Eureka, Calif., were to: (1) sample randomly concentrations of pink shrimp (Pandalus jordani) for determining population estimates and natural mortality rates; (2) determine sizes, sex, and weight of shrimp; (3) save all rare or unusual invertebrates and fish for various collections and the State Fisheries Laboratory at Terminal Island; and (4) collect stomachs from Pacific hake (Merluccius productus) and arrowtooth halibut (Atheresthes stomias) for relative abundance studies of juvenile shrimp.



M/V Alaska Cruise 65-A-5-Shrimp (Area A), June 1-July 1, 1965.

Three sets of 39 tows were completed on the cruise. The tows from each set were randomly distributed over the 270-square-mile survey area between the mouth of Mad River and the Oregon border. The average distance of each tow was  $\frac{1}{2}$  mile, thus covering an area of 75,950 square feet (assuming a net opening of 25 feet). The same net was used as on the March-April 1965 survey by the vessel Alaska--a semiballoon, Gulf of Mexico shrimp trawl with 41-foot headrope and 1-inch stretched mesh. A  $\frac{1}{2}$ -inch stretched mesh liner was used in the cod end to prevent 1-year-old shrimp from escaping. Fishing depths ranged from 40 to 100 fathoms.

The 270-square-mile survey area covered consisted of 190 square miles where 50 pounds or more per hour of shrimp could be taken. It was found that 300 pounds or more an hour (commercial concentration) could be taken in an area of 121 square miles. Average catch an hour (excluding yields under 36 pounds per hour) was 390 pounds and ranged from 36 to 3,336 pounds. It was estimated that 5.7 million pounds of shrimp remain on the bed. The shrimp count (heads-on) per pound ranged from 70 to 205, with a mean of 166 to the pound.

Several unusual cephalopods and fish caught during the cruise were sent to the California State Fisheries Laboratory for identification. A total of 83 arrowtooth halibut and 51 hake stomachs were collected and preserved for examination in the laboratory.

Note: See Commercial Fisheries Review, August 1965 p. 26.

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#### SURVEY OF CRAB RESOURCES IN COASTAL WATERS CONTINUED:

M/V "Nautilus" Cruise Report 65-N-2A-F (January 14-20, February 10-15, March 29-April 3, April 12-17, May 11-17, June 24-30, 1965): To determine if a reduced male population of dungeness or market crab (Cancer magister) is adequate to maintain the resource was the main objective of these trips. Another objective was to determine the distribution and abundance of crab larvae. The waters of central California from Point Reyes to Pedro Point were surveyed for this purpose by the research vessel Nautilus, operated by the California Department of Fish and Game.

Eight plankton stations were visited by the research vessel during each of the 6 cruises

from Point Reyes to Pedro Point. At each station, 10-minute plankton tows were made at the surface and at a depth of 10 meters (32.8 feet). The plankton was preserved in formalin for further examination. Commercial-type traps were set at selected stations to obtain male and female crabs to examine for evidence of mating. Limited trawling was conducted at stations from San Francisco to Drakes Bay.

Plankton taken on the cruise has not been analyzed completely, but preliminary examination showed crab larvae were abundant from January through March, and decreased in abundance from April to June. A few megalops of Cancer magister taken on April 14 at Drakes Bay were held in a laboratory aquarium. They molted into the first crab instar on April 30. This is the earliest the first crab instar has been noted in central California. Megalops of C. gracilis and C. productus, also taken during this study, molted into first crab instars April 20. Sea surface temperatures were lowest in May when they ranged from 9.4° C. (49° F.) at one station covered to 11.4° C. (52.6° F.) at another station near San Francisco Bay. Temperatures were highest in June, ranging from 11.6° to 13.2° C. (52.8° to 55.8° F.) in the same areas, respectively.

Female market crabs were examined for evidence of fertilization and to determine if they had carried eggs. In January, 75 percent of the females had carried or were still carrying eggs. Some mating activity was indicated by fresh mating marks on chelipeds of a few male crabs. In February, more mating activity was evident--28 percent of the males had mating marks and 3 soft females were taken.

During the last of March, 71 percent of the males bore mating marks, and 13 percent of the females were soft. A total of 71 females were dissected and their spermatheca examined. In 93 percent, the spermatheca was full and white; 7 percent had spermatheca which were hard or empty, or contained a hard red plug which may have resulted from incomplete shedding of the eggs.

The April 12-17 cruise revealed 77 percent of the males had mating marks and 31 percent of the females were soft. Dissection of 40 females showed 92 percent with full white spermatheca and 8 percent empty. Ovary color ranged from white to red-orange.

Soft females generally had white ovaries, while the color changed to orange as the shell hardened.

During May, only 68 percent of the males had mating marks; the percentage drop was a direct result of molting. About 22 percent were soft and 10 percent were hard, and there was no evidence of mating among those. Of 60 females examined for evidence of fertilization, 55 had full white spermatheca, 3 had hard spermatheca, 1 had a hard red plug, and 1 immature female 4.1 inches long had not been fertilized.

In late June, 52 percent of the males were soft and mating had almost stopped. Twenty females then examined for evidence of fertilization had full spermatheca.

Note: See Commercial Fisheries Review, April 1965 p. 17.

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#### SAN FRANCISCO BAY INVESTIGATIONS CONTINUED:

M/V "Nautilus" Cruises 65-N-1A-C-D-E-F-San Francisco Bay Study (January 8-13, March 23-27, April 19-23, May 5-9, June 20-23, 1965): Studies in San Francisco Bay (south of San Pablo Bay) were resumed with these cruises by the research vessel Nautilus of the California Department of Fish and Game. Objectives were to: (1) collect fish and invertebrates routinely at six stations; (2) determine distribution and relative abundance under prevailing environmental conditions; (3) define ecological zones of the bay; and (4) determine the food organisms of the principal species and their availability.

The six stations worked in the Bay study area had an average depth ranging from 15 to 50 feet. Station locations were:  $\frac{1}{2}$  mile south-east of Redrock;  $\frac{1}{4}$  mile east of middle of east side of Treasure Island;  $\frac{1}{4}$  mile west of middle of west side of Treasure Island;  $\frac{1}{4}$  mile west of radar pylon on San Bruno shoal;  $\frac{1}{2}$  mile north of red buoy at entrance to channel to Redwood City Harbor; and  $\frac{1}{4}$  mile east of Dumbarton railroad bridge.

During the cruise a square-mouthed mid-water trawl 25 feet on a side was towed for 20 minutes at the surface. Each station was also sampled by a 20-minute bottom tow with a 15-foot otter trawl having 1-inch mesh. Six special additional otter trawl tows were made just north of the Richmond-San Rafael Bridge on May 9; two more tows were made in the same location on June 23.

Fish caught during the cruise were identical to those previously taken in the San Francisco Bay Study, except for three which were new to the study. The new species were bocaccio (*Sebastes paucispinis*), carp (*Cyprinus carpio*), and white sturgeon (*Acipenser transmontanus*). The addition of these 3 species brought the total of species taken in the study to 67.

Water samples for temperature and salinity determination were taken at the surface and bottom at the first 5 stations covered, and at the surface at the sixth which was in shallow water. Temperatures were almost the same as for the same months in 1963 and 1964. Salinities were very similar to those in 1963; in 1964 they were consistently higher.

Note: See Commercial Fisheries Review, April 1965 p. 18.

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#### COMMERCIAL SHRIMP FISHING AREA CLOSED FOR SEASON:

The closure of commercial shrimp fishing in Area A off the coast of northern California was announced July 27, 1965, by the California Department of Fish and Game, and became effective at midnight July 31.

Under a State law which gives the Department of Fish and Game authority to protect the shrimp resource, the ocean area is ordered closed to shrimp fishing when the annual quota established by the Fish and Game Commission has been reached. The quota for 1965 was set at 1 million pounds. Shrimp Permit Area A extends from the California-Oregon border south to False Cape.

Under a cooperative arrangement with California, the State of Oregon also orders its commercial shrimp fishermen out of the area for the remainder of the year. (California Department of Fish and Game, July 27, 1965.)

Note: See Commercial Fisheries Review, September 1964 p. 14.

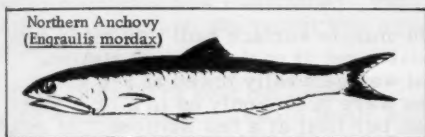
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#### PLAN SOUGHT FOR SCIENTIFIC MANAGEMENT OF ANCHOVY RESOURCE:

The California Department of Fish and Game has been instructed by its Commission to prepare a proposal for scientific management of the anchovy resource in waters off the California coast. This action is in accordance with Governor Brown's statement



when he pocket vetoed a bill that would have allowed commercial fishing for anchovies for reduction into poultry feed and other products. The Governor said in his veto message he believed management of the anchovy resource, issuance of permits for reduction, and control of the harvest could best be accomplished under jurisdiction of the Fish and Game Commission. The Governor said this would allow flexibility in the scientific management of the anchovy resource and would permit immediate closing of the fishery for reduction if at any time the resource should be threatened.



The Commission instructed the Department of Fish and Game to present a proposal for managing the anchovy resource for discussion at the Commission's meeting which was to be held in San Francisco on August 27, 1965. The Commissioner said, "Governor Brown's veto of the anchovy bill has opened the way to long-range, scientific management of the anchovy resource. Members of the Commission are aware of the will of the Legislature and the views of the Governor on this matter, and we are confident the Department of Fish and Game will present a workable scientific plan which will provide for appropriate harvesting of anchovies and at the same time will afford long-term protection of this important ocean fisheries resource."

The Commission planned to meet in Los Angeles on October 1 to give formal consideration to proposed anchovy fishing regulations developed by the California Department of Fish and Game. (The proposed regulations were developed in lieu of Assembly Bill 2756, which failed to become law.) At the October 1 meeting, statements were to be received from interested persons, after which final anchovy regulations would be adopted. (California Department of Fish and Game, July 27 and August 21, 1965.)

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#### MARINE SPORT FISH SURVEY OFF SOUTHERN CALIFORNIA CONTINUED:

Airplane Survey Flight 65-8 (July 10, 1965):  
This was the second in a series of aerial flights

conducted by the California Department of Fish and Game to make instantaneous counts of poles and fishermen along the coast. For that purpose, the southern California coastline from the Mexican Border to Jalama Beach State Park was surveyed from the air by the Department's aircraft Cessna "182" N9042T. The counts taken will eventually be used in estimating shore fishing effort in southern California during 1965.

On this flight, the California coastline was surveyed from south to north between the hours of 11:00 a.m. to 3:20 p.m. with a 1-hour stop at Goleta. A hazy overcast did not interfere with making accurate observations.

A total of 282 poles attended by 274 fishermen was counted. A total of 58 or 21 percent of the fishermen were in areas (mainly military and private) not included in the regular shoreline sampling. Greatest concentrations of fishermen were noted between Leucadia and south Laguna Beach, north Huntington Beach to the Long Beach Rainbow Pier, and Topanga Beach to Mandalay Beach. Those three areas contained over 62 percent of all fishermen counted.

The flight indicated considerable effort in private and semiclosed areas, and emphasized the need for at least bimonthly flights in order to measure that effort.

Airplane Survey Flight 65-9 (July 27, 1965): The same coastline area as on the July 10 flight was surveyed during this flight by the Cessna "182" N9042T.

The weather was generally clear throughout the surveyed area. The bright sunlight was reduced (or intensified) by various amounts of haze, smog, or a combination of both. A moderate northwest breeze began blowing late in the morning and increased in intensity by midafternoon, with sufficient strength to create whitecaps.

The survey began at 9:45 a.m. at the Mexican Border and progressed northwestward along the shoreline to Goleta Beach Park. Goleta Beach Park to Jalama Beach State Park was covered in 25 minutes flying time shortly after noon. The entire survey was made from an altitude of 500 feet.

The count on this flight was 119 fishing poles. It was not practical to count the people attending the poles because of the large

number of bathers and onlookers, and the altitude of the plane. Small groups of fishermen (e.g. poles), numbering up to 3 or 4, were well spread out along the entire coast except for a concentration of 37 poles near the Mandalay Steam Plant (between Port Hueneme and Ventura).

Three broad areas were observed to be infested with a well developed "red tide", from Seal Beach south of Laguna Beach, Santa Monica Bay (a relatively narrow band paralleling the shoreline), and Ventura to Port Hueneme. Areas west of Ventura were relatively free of red tide, with pockets of crystal-clear water. Los Angeles-Long Beach harbor had its usual murky color with an intense spot of red near Belmont Shore Pier.

Note: See Commercial Fisheries Review, August 1965 p. 27.



### Cans--Shipments for Fishery Products, January-June 1965

A total of 1,452,157 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-June 1965 as compared with 1,347,894 base boxes used during the same period in 1964. It is believed that somewhat larger shipments to the Pacific or Western Area (principally for salmon and tuna) and also to the Eastern Area (for the Maine sardine packing season) accounted for the increase in 1965.



Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.



### Central Pacific Fisheries Investigations

#### EQUIPMENT TESTED FOR SAMPLING TUNA LARVAE:

M/V "Charles H. Gilbert" Cruise 83 (June 7-24, 1965): To make a series of surface hauls with both plankton and neuston nets in order to determine their effectiveness for sampling tuna larvae and juveniles was the primary objective of the cruise. The leeward waters off the island of Oahu was the area covered by the research vessel Charles

H. Gilbert of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii.

During the cruise, simultaneous 1- and 2-meter (3.3 and 6.6 feet) net hauls were made at 68 stations worked by the vessel. Four hauls at various intervals were made each night for 17 nights. The 2-meter net caught more tuna larvae than the 1-meter net, but the catch ratio between the two nets was closer to 2:1, rather than the 4:1 ratio expected on the basis of volume of water strained. The 2-meter net performed satisfactorily in deep oblique tows.

A 20-minute surface haul was made with the neuston net at each of the 68 stations. The net was generally towed at 5-6 knots. Catches were poor--only up to 5 or 6 juvenile fish per haul at a few stations. At most stations only a few hundred copepods and other invertebrates were taken. The largest fish taken was a 15-inch long half-beak (Hemiramphidae). No tuna was taken.

A total of 24 skipjack tuna, 17 yellowfin, and 14 "albacore" (Ueyanagi's description) eye lenses were collected from plankton samples and dry-frozen during the cruise. Other operations included the release of drift cards and collection of bathythermograph (BT) data.

Bright moonlight throughout the cruise period reduced the catches of larval tuna considerably. Hauls made in darkness prior to moonrise or after moonset yielded better catches than those made when the moon was high. Very few birds were seen in the area; several bird flocks were seen on two occasions near the end of the cruise.

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#### SKIPJACK TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 84 (July 12-16, 1965): The collection of live mackerel-like (scombrids) species for behavior studies was one of the main objectives of this cruise by the research vessel Charles H. Gilbert, operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. The area covered was south of Oahu between Mokuumanu and Kaena Pt., and not more than 20 miles from shore.

Other objectives of the cruise were to:  
(1) collect tuna specimens for density deter-

minations, (2) determine weight lost from medium and large skipjack tuna after removal of head and viscera, (3) take photographs of fishing operations, and (4) collect water samples for bacteriological study.

Caught during the cruise and returned live to the Bureau's facility at Kewalo Basin were 103 skipjack tuna, 7 frigate mackerel, 1 little tuna, and 1 yellowfin.

Fishing operations were photographed as planned, water samples were obtained, and the usual standard watch for fish, birds, and aquatic mammals was maintained. Thermograph and barograph equipment was operated continuously.

Troll lines were kept out continuously during the cruise between Kewalo Basin and each fishing station covered; total trolling time was 16 hours and 50 minutes. Two mahimahi (*Coryphaena hippurus*), better known as dolphin, were caught.

Note: See *Commercial Fisheries Review*, September 1965 p. 20.

\* \* \* \* \*

#### RESULTS OF PLANKTON NET TESTS IN HAWAIIAN WATERS:

Probably the most elusive fish in the sea are those from a few days to a few weeks old. They do not appear in the commercial catch (except in the stomachs of other fish) and often are able to swim fast enough to dodge the nets that marine biologists use to collect the plankton, the drifting plants and animals of the ocean. Specimens of the larval fish are essential in the study of many fishery problems.

The net commonly used to collect plankton is one meter (39.4 inches) in diameter at its mouth. It has been suggested that a net with a larger mouth opening might be able to catch more of the larval fish, which would have farther to swim to escape the oncoming net.

Recently, a biologist at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, designed and constructed a square net 2 meters to the side and towed it and a standard 1-meter net simultaneously, the 2-meter net on the starboard side, the 1-meter net on the port side of the Laboratory's research vessel *Charles H. Gilbert* (Cruise 83, June 7-24, 1965). Both nets were weighted to keep them just below

the surface of the water. Towing speed, usually about 3 knots when the 1-meter net alone is used, had to be restricted to about 2 knots to keep the larger net from breaking the surface.

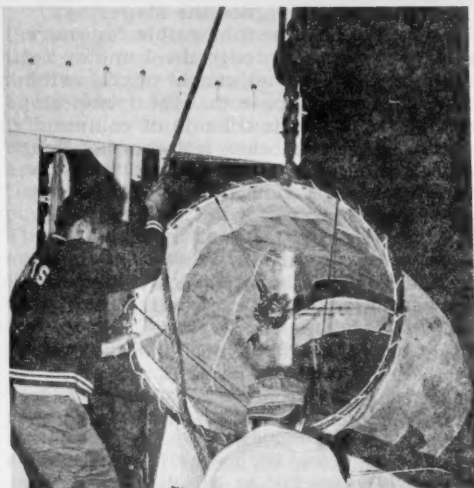


Fig. 1 - A standard plankton-collecting net with 1-meter mouth opening.

Four hauls were made each night for 17 consecutive nights on the lee side of the island of Oahu (on which Honolulu is located) and in waters fished by the commercial fishing fleet for skipjack tuna, the predominant species in the Hawaiian commercial fish catch.



Fig. 2 - A plankton net with 2-meter opening to the side (designed by a U.S. Bureau of Commercial Fisheries biologist).

Both skipjack and yellowfin tuna larvae were taken, the skipjack being many times more plentiful. The larger net caught more of the larger larvae, about a quarter of an inch long, than did the 1-meter net. The Bureau biologist who designed the larger net said that it may have been possible for more of the larger larvae to dodge the 1-meter net. Although the 2-meter net caught nearly twice the number of tuna larvae that the 1-meter net did, on the theoretical basis of volume of water strained, the catches fell short of the expected 5 to 1 ratio. (Being 2 meters square, the larger net has a mouth area 5 times that of the 1-meter net.)

There were two circumstances bearing on that cruise by the Laboratory's research vessel that had particularly interesting implications for research on larval tuna. Bright moonlight prevailed throughout the cruise period. When a tow was made in complete darkness prior to moonrise or after moonset, or when the moon was low, the larval catches were good. During such periods, the 2-meter net caught from 16 to 61 larvae in each tow. When the moon was bright, catches were poor, from no larvae at all to 9 a tow. When the moon was obscured by cloud cover for some time before the tow, the catch would be similar to that made in darkness.

The other circumstance related to the distribution of the skipjack tuna fishery. When Cruise 83 began, fishing had been good on the lee side of Oahu. Shortly afterward, the fishery moved southeastward toward the island of Hawaii, following the adult skipjack. For a week and a half the vessel made good

larvae catches in the lee of Oahu, apparently collecting larvae that had been spawned there before the adults left the area. Then in a matter of a day or two, larval catches dropped to almost nothing.

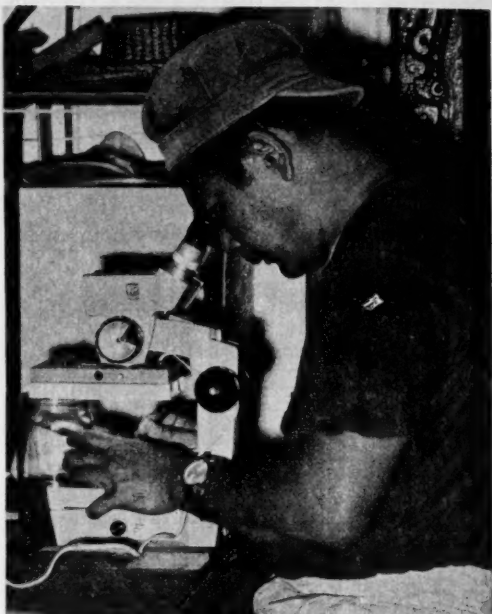


Fig. 4 - Plankton samples being analyzed at sea.

A second mission of the Charles H. Gilbert cruise was to test the British neuston net, a small net attached to a sled pulled rapidly through the water. It is designed to catch sea animals in the surface layer (the neuston). In the Arabian Sea, where it was first used, a 15-minute tow yielded over 1,000 young frigate mackerel (a small tunalike fish), measuring from  $\frac{5}{8}$ -inch to  $1\frac{1}{2}$  inches long, a size very difficult to capture by conventional techniques. Off Oahu, it was towed for 20 minutes at each of the 68 stations covered at a speed of about 5 knots. Catches were extremely poor. This may have been due to the prevailing moonlight, the Bureau's biologist said.

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#### SUBMARINE STUDIES OFF HAWAII:

The 2-man submarine Asherah was scheduled to arrive in Hawaii on September 11, 1965, to spend a month making research dives for the U. S. Bureau of Commercial

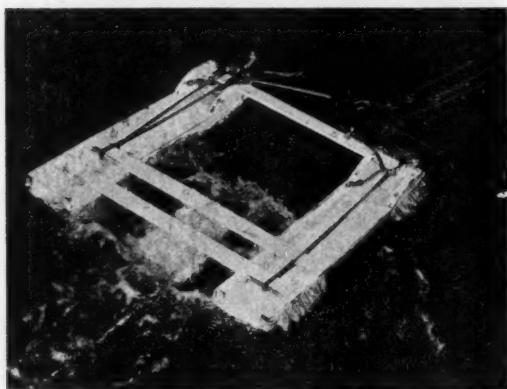


Fig. 3 - British-designed neuston plankton net (small net attached to floats on either side).



Fisheries Biological Laboratory in Honolulu. Plans called for the craft to work a 6-day week, making daily dives in the vicinity of Barber's Point, after being towed to sea by the Honolulu Laboratory's research vessel Townsend Cromwell. During operations at Barber's Point, the Asherah was to dock at the Nenuë, a 12-foot-square raft anchored in water 1,000 to 1,500 feet deep.

The Asherah is 16 feet long. Battery powered, she is capable of a speed of 4 knots submerged. Pilot and observer sit in bucket seats in a 6-windowed sphere 5 feet in diameter. The Asherah is completely maneuverable in all directions. It may power itself to the surface, to the bottom, or hover. It is equipped with an underwater telephone to maintain continuous contact with surface facilities. Its maximum operating depth is 600 feet. There are two motors, one mounted on each side.

A series of research projects bearing on the commercial potential of Hawaiian waters have been planned for the submarine. One investigation will consist of a survey of the fishery potential of the bottom area. The rocky bottom off the Hawaiian coast has been little studied. The Asherah offers scientists their first opportunity to make direct observations of the creatures that live there. Some of those might have commercial potentials.

In another study, long-line fishing gear will be set out by the Townsend Cromwell and observed by the submarine. In long-line fishing, hooks are attached to drop lines which hang from the long-line. It is a method used by a part of the Hawaiian fleet and with great success by Japanese fishermen.

No one before has had the chance to observe what actually is happening at the long-line hooks several hundred feet below the sea surface. Scientists are particularly interested in whether the fish approach the hooks in schools or whether they are dispersed. The question is one of more than academic interest--if the fish are in schools, perhaps new and more efficient methods could be developed to catch them in commercial quantities.

In a related study, a series of large objects (10-foot discs) will be attached at 100-foot intervals to the Nenuë's anchor chain. It is known that fish gather about floating objects at sea. It is also known that they gath-

er around large objects on the sea bottom. Now it will be possible to see if the 10-foot discs act as "fish collectors" in the intervening layers of the sea.

Other studies are aimed at understanding the forage or food of tuna. This consists of the small animals that make up the plankton and the larger animals, such as fish and squid, which feed upon plankton. Plankton is known to rise to the surface at night and descend during the day. Sometimes there are clouds of plankton so thick that it reflects underwater sound, a phenomenon that puzzled the U. S. Navy during World War II. There have been few opportunities for scientists to observe these "deep scattering layers" directly. A planktologist will make several dives to investigate the phenomenon, and another scientist will observe the fish associated with the plankton layers.

Another investigation will find the Townsend Cromwell towing standard plankton collecting nets while the Asherah follows to allow observations of the behavior of fish and other creatures as the net approaches.

In another study, the attenuation of light beneath the sea surface will be measured.

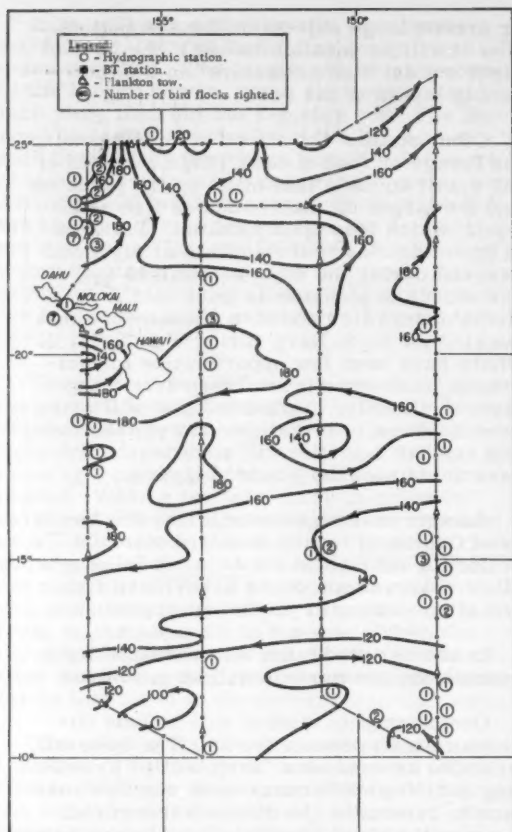
Oceanographic studies will include observations on oceanic fronts. The Asherah will also be used as a "drift bottle" by letting it drift at different depths and then surface to determine the distance traversed.

Scientists from the University of Hawaii also planned studies with the Asherah.

Note: See Commercial Fisheries Review, Aug. 1965 p. 50.

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FINAL CRUISE COMPLETES  
FIRST PHASE OF TRADE WIND ZONE  
OCEANOGRAPHIC RESEARCH PROJECT:  
M/V "Townsend Cromwell Cruise 17"  
(June 10-July 2, 1965): This was the last in a series of oceanographic cruises to determine rates of change in the distribution of properties in the trade wind zone of the central North Pacific (latitude 10° N., 27° N. and longitude 148° W., 158° W.). A total of 43 oceanographic stations was occupied by the U. S. Bureau of Commercial Fisheries research vessel Townsend Cromwell along the cruise track. At each station, temperatures and samples for salinity analysis were obtained at various depths, and several deep



Track chart of research vessel Townsend Cromwell Cruise 17 (June 10-July 2, 1965), showing the geostrophic interpretation of the 20° isotherm.

casts ranging up to 5,000 meters (16,404 feet) were taken at designated stations.

The overall circulation pattern for June was similar to that observed in May 1965 (Cruise 16). But there were a few noticeable changes in the system of eddies and the directions of the flow lines. The large clockwise circulation seen during the previous month around the Islands had since broken down into a number of smaller systems. A relatively intense counterclockwise eddy had appeared just west of Hawaii. A similar eddy seen in May at 19° N., 148° W., appeared to have moved westward. To the north of the Islands, the generally eastward flow had begun to curve back to the north and northwest, forming a large counterclockwise flow. South of the Islands, the westerly flow seemed to be moving at about the same intensity as dur-

ing May, as judged by the slopes of the isotherms.

A slight cooling of the surface waters was seen in the northeastern sector of the study area, where temperatures of less than 23.0° C. (73.4° F.) were registered. During May, the lowest temperatures were about 23.5° C. (74.3° F.). In the southern section, however, the 26.5° C. (79.7° F.) isotherm had moved northward.

A total of 69 bird flocks was sighted on the cruise as compared with 62 during the May cruise. A large number of those flocks were seen in the southeast sector in contrast to the May distribution.

Other operations during the cruise included the usual series of bathythermograms and surface plankton tows, the use of a Hytech *in situ* salinity-temperature-depth recorder, release of drift bottles, and collection of other oceanographic data.

Note: See *Commercial Fisheries Review*, September 1965 p. 21.



## Columbia River

### SALMON FISHERY REOPENED BELOW BONNEVILLE DAM:

Commercial fishing for salmon in the Columbia River was resumed July 29, 1965, in Area 1 (between the mouth of the river and a point 5 miles downstream from Bonneville Dam). The commercial fishery in that area was scheduled to continue (with weekend closures) until August 25, 1965.

The Columbia River below Bonneville Dam was also reopened to sport salmon fishing on July 29, 1965, but the ban on sport fishing above Bonneville Dam was to continue until August 20, 1965.

The Columbia River had been entirely closed to salmon fishing since late June 1965. The opening below Bonneville Dam was designed to harvest the early fall chinook and coho salmon runs in the river. (Washington State Department of Fisheries, July 28, 1965.)

Note: See *Commercial Fisheries Review*, Aug. 1965 p. 33.



## Crab Meat

### PLASTIC CONTAINER APPROVED BY MARYLAND:

A plastic container for use in packing fresh-picked pasteurized crab meat has been approved by the Maryland State Health Department. The plastic container when properly used provides an overall product protection equal to the metal cans now in use, according to tests made by the University of Maryland's Seafood Processing Laboratory at Crisfield, Md.

Announcing approval of the plastic container on July 7, 1965, a Maryland State Health official said, "if pasteurized at the recommended temperature of 185° F. for 110 minutes and refrigerated properly, there is no reason why crab meat can not be marketed in these packages which have an obvious added consumer appeal." Industry representatives were cautioned, however, that those using the new plastic containers must follow the pasteurization process worked out by the Seafood Processing Laboratory. Industry members were also urged to visit the Laboratory and observe the correct method of sealing plastic cans.

The technician in charge of the Laboratory tests of the new container said, "there was no significant difference in taste or appearance between the meat stored in the metal and the plastic containers for the first 4 months of storage, but after this period our taste panels definitely preferred the crab meat stored in plastic. There was no significant difference in the texture of the meat during the entire 6 months storage cycle we had set for the tests." (Natural Resources Institute, University of Maryland, College Park, Md.)



## Fish Sticks and Portions

### U. S. PRODUCTION, APRIL-JUNE 1965:

United States production of fish sticks and fish portions amounted to 51.0 million pounds during the second quarter of 1965, according to preliminary data. Compared with the same quarter of 1964, this was an increase of 12.1 million pounds or 31.2 percent. Fish portions (32.5 million pounds) were up 9.4 million pounds or 40.6 percent, and fish sticks (18.5 million pounds) were up 17.4 percent.

Table 1 - U. S. Production of Fish Sticks by Months and Type, April-June 1965 1/

Month	Cooked Raw Total		
	... (1,000 Lbs.) ...		
April .....	6,051	286	6,337
May .....	5,041	356	5,397
June .....	6,513	250	6,763
Total 2nd Qtr. 1965 1/ .....	17,605	892	18,497
Total 2nd Qtr. 1964 2/ .....	14,419	1,330	15,749
Total 1964 2/ .....	67,810	5,722	73,532

1/ Preliminary.  
2/ Revised.

Table 2 - U. S. Production of Fish Portions by Months and Type, April-June 1965 1/

Month	Breaded			Un-breaded	Total
	Cooked	Raw	Total		
	. . . . . (1,000 Lbs.) . . . . .				
April . . . . .	2,260	8,190	10,450	196	10,646
May . . . . .	1,725	8,602	10,327	233	10,560
June . . . . .	1,648	9,498	11,146	179	11,325
Tot. 2nd Qtr. 1965 1/	5,633	26,290	31,923	608	32,531
Tot. 2nd Qtr. 1964 2/	4,891	17,807	22,698	442	23,140
Total 1964 2/	20,956	82,135	103,091	2,541	105,632
1/ Preliminary.					

1/ Preliminary.  
2/ Revised.

Cooked fish sticks (17.6 million pounds) made up 95.2 percent of the April-June 1965 fish stick total. There were 11.1 million pounds of breaded fish portions produced, of which 9.5 million pounds were raw. Un-breaded fish portions amounted to 179,000 pounds.

The Atlantic States remained the principal area in the production of both fish sticks and fish portions, with 14.1 and 20.0 million pounds, respectively. The Inland and Gulf States ranked second with 11.8 million pounds of fish portions. The Pacific States ranked second with 2.3 million pounds of fish sticks.



## Great Lakes

### LAKE TROUT

#### REHABILITATION PROGRAM:

Projects that are under way to revitalize the lake trout fishery in the Great Lakes include: (1) initial restocking of that species in Lake Michigan, (2) completion of the first round of lampricide treatment of that lake's tributary streams, and (3) substantial additional plantings of young lake trout in Lake Superior.

During summer 1965 more than 1.2 million yearling lake trout were set free in northern Lake Michigan where sea lamprey are

expected to be substantially reduced by 1967. Due to their small size, the lake trout are expected to be safe from attacks by the predators during the next two years. Chemical treatment of Lake Michigan's lamprey-spawning streams was started in 1960, and all 99 streams will have had at least one application of lampicide by spring 1966.

Another step in the lake trout rehabilitation program calls for closing Lake Michigan to commercial fishing for that species in order to protect the hatchery lake trout planted in the lake. The State of Michigan Department of Conservation scheduled public hearings this past July to consider a proposal to adopt a regulation for that purpose effective October 1, 1965. Wisconsin was expected to impose a similar measure for its Lake Michigan waters.

In Lake Superior, more than 1.8 million young lake trout were to be planted during summer 1965, bringing the total in this restoration project to nearly 12 million fish. Of the total number of young lake trout to be released in 1965, about 1.3 million will be in United States waters and about 500,000 in the Ontario section of Lake Superior. (Great Lakes News Letter, May-June 1965.)

Note: See Commercial Fisheries Review, August 1965 p. 37.



## Great Lakes Fisheries Explorations and Gear Development

### LAKE HURON TRAWLING STUDIES:

M/V "Kaho" Cruise 27 (July 14-August 4, 1965): This 21-day cruise in Lake Huron and Saginaw Bay was the first in a series of cruises to explore the potential of developing more effective and efficient methods for catching and handling fish stocks in Lake Huron.

The primary objectives of the cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Kaho were to determine the location, bathymetric distribution, abundance and seasonal availability of various species of fish to bottom trawls, and to locate areas suitable for bottom trawling. Since yellow perch were not taken in Saginaw Bay in the amounts expected, the cod-end mesh size selectivity study planned for that species was cancelled and the time used to extend explorations into a larger segment of

Lake Huron than was originally intended. Other activities included collecting fish and bottom samples for botulism and limnological investigations.

Trawl fishing in the Saginaw Bay area of Lake Huron revealed alewife and carp populations of sufficient size to support a high-volume fishery that could produce raw material for the manufacture of pet food, mink food, or fish meal. Further seasonal assessments are needed, however, to verify the true potential for such a fishery. A total of 24 out of 31 half-hour drags in that area yielded catches ranging from 250 to 1,650 pounds, and averaging 610 pounds. Catch rates of 250 pounds or more with the relatively small standard sampling net used for explorations are considered of commercial significance even for low-value species. The total catch of 21,010 pounds was composed of 86 percent alewife, 5.5 percent carp, 5 percent smelt, 2 percent chub, and 1.5 percent other species.

**FISHING OPERATIONS:** A total of 84 drags was made during the cruise--31 in Saginaw Bay and 53 in the open lake. All drags were made with a standard 52-foot (headrope) Gulf of Mexico-type fish trawl, each lasting 30 minutes except for 11 drags which were ended early due to snags, rough bottom conditions, or set fishing gear. Gear damage occurred on 12 drags. The damage was only minor on 4 of them, but major net damage or loss occurred during the other 8 drags. The incidence of gear damage was much greater from Harrisville north, where 1 out of 3 drags resulted in gear damage. The rate of gear damage south of Harrisville was only 1 out of 18 drags.

**FISHING RESULTS (Saginaw Bay):** The results of fishing in Saginaw Bay indicate a large abundance of alewife which accounted for 90 percent of the catch. Carp made up 8 percent and smelt 1.5 percent. Only 47 pounds of yellow perch were landed during the entire cruise.

The average catch rate for all species in Saginaw Bay each half hour was 521 pounds, 467 pounds of which were alewife. The best individual catches of alewife (1,000 and 1,600 pounds) were taken in 12-15 fathoms in mid-bay between Tawas City and Huron City. The best catch of carp was 400 pounds taken in 4 fathoms off Pt. Au Gres; and the best smelt catch was 98 pounds taken in 17 fathoms NW.



of Port Austin. Other species were caught in small amounts only. Species other than alewife, carp, yellow perch, smelt, and chub in Saginaw Bay trawl catches included small amounts of catfish, sucker, spottail shiner, and a few pounds of common whitefish and trout-perch.

**FISHING RESULTS (Lake Huron):** With the exception of good catches of 700, 900, and 1,300 pounds of alewife taken off Oscoda and Huron City, catches of all species were very light in the open lake. The average catch for each half-hour drag in Lake Huron was only 124 pounds, of which 97 pounds were alewife. The species composition for all drags in the open lake was: alewife 79 percent, smelt 13 percent, and chub 6 percent. Other species taken amounted to only 2 percent of the catch. The highest catch rate of alewife during the cruise was at 15 fathoms off Huron City where a 10-minute drag yielded 900 pounds--a half-hour catch rate of 2,700 pounds.

Off Harbor Beach and Port Hope, catches were very light with the best consisting of 160 pounds. North of Harrisville, catches were also very light and averaged only 82 pounds a drag. Two-thirds of the total quantity landed in the northern end of the lake (less than a ton) were alewife. The best catch of alewife in northern Lake Huron was 300 pounds taken in St. Martins Bay. The best smelt catch of the cruise was 100 pounds taken in 25 fathoms off Harrisville, and the best catch of chubs (mostly bloaters) was 80 pounds taken in 35 fathoms off Alpena.

Species other than alewife, chub, and smelt in the open Lake Huron trawl catches included stickleback (68 pounds), sculpin (24 pounds), round whitefish (16 pounds), common whitefish (15 pounds), long-nose sucker (16 pounds), and very small amounts of several other species.

**HYDROGRAPHIC DATA:** During the cruise, thermal gradients were recorded using a bathythermograph and continuous surface temperature recorder. Bottom temperatures ranged from 41° to 70° F. and surface temperatures ranged from 42° to 70° F.

Note: See Commercial Fisheries Review, Sept. 1965 p. 28.



## Gulf Fisheries Explorations and Gear Development

### SURVEY OF BOTTOM-TRAWL FISH POTENTIAL OFF FLORIDA WEST COAST:

M/V "Hernan Cortez" Cruise 2 (May 22-July 12, 1965): This was the second cruise of a two-month survey of the bottom-trawl fish potential off Florida's west coast by the Florida Conservation Department research vessel *Hernan Cortez*. The project, conducted under a cooperative agreement between the Florida Conservation Department and the U. S. Bureau of Commercial Fisheries, was designed to determine the species present in the area and to obtain information on their availability to trawling gear within the 5- to 50-fathom depth range.

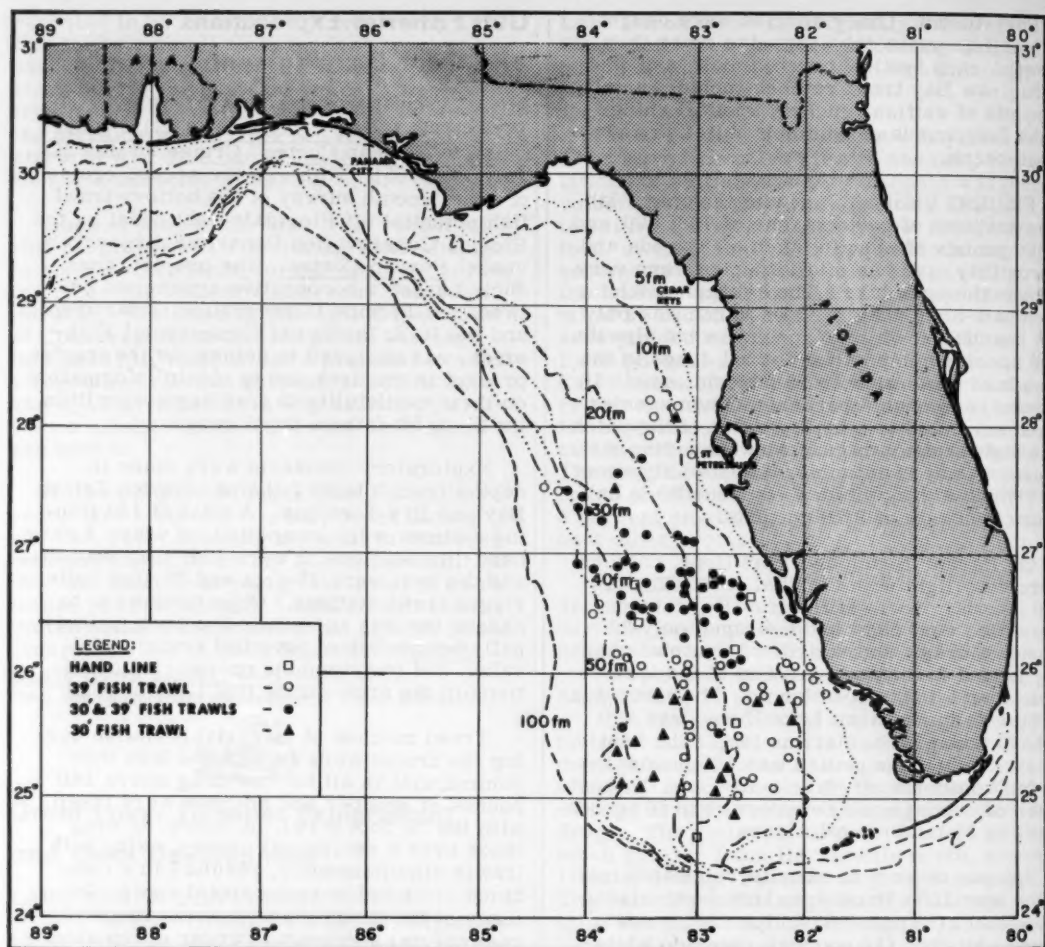
Exploratory transects were made in depths from 5 to 50 fathoms between Tampa Bay and Dry Tortugas. A total of 129 fishing stations were completed, of which 6 were hand-line stations, 2 were fish-trap stations, and the rest were 30-foot and 39-foot roller-rigged trawl stations. Objectives were to assess the fish species in the area, principally bottomfish of potential commercial value, and to determine operational conditions in the area during that time of year.

Trawl catches of marketable finfish during the cruise were considered less than commercial in all but one drag where 160 pounds of grouper and snapper were taken with the 39-foot trawl. A follow-up drag made over a reciprocal course, using both trawls simultaneously, resulted in a combined catch below commercial scale. In many of the drags made, the size range of commercial species was under acceptable market size and considered noncommercial.

Operational conditions in the area covered were generally good. In certain areas between Fort Myers and Cape Romano (in depths from 10 to 25 fathoms), bottom "grasses" hindered satisfactory trawling. Loggerhead and fire sponges were also present in a number of drags but not in sufficient amount to hamper fishing. Trawling with the roller-rigged nets was accomplished over much rough bottom without appreciable gear damage. Only one hang-up occurred, and the gear was not damaged in that instance.

Fish catches of commercial interest included gray snapper, lane snapper, and red





Shows area of operations during cruise by research vessel Herman Cortez (May 22-July 12, 1965).

and black grouper. Vermilion snapper, with one exception, were caught less frequently and were of smaller size than in the previous cruise of the Herman Cortez (April-May 1965). Catches of Spanish lobster, in general, were progressively less frequent as the trawling operation moved southward from Tampa Bay to the Dry Tortugas area.

Surface school fish were observed usually inside the 10-fathom depth contour with the greatest concentrations occurring near Tampa Bay, Fort Myers Beach, and Cape Romano. Trolling lines fished between stations caught little tuna, king mackerel, and Spanish mackerel. Routine meteorological and water tem-

perature data were recorded throughout the cruise.

Note: See Commercial Fisheries Review, August 1965 p. 39.



## Industrial Fishery Products

### U. S. FISH MEAL, OIL, AND SOLUBLES:

Production by Areas, July 1965: Preliminary data on U. S. production of fish meal, oil, and solubles for July 1965 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International

U. S. Production 1/ of Fish Meal, Oil, and Solubles, July 1965 (Preliminary) with Comparisons			
Area	Meal Short Tons	Oil 1,000 Pounds	Solubles Short Tons
July 1965:			
East & Gulf Coasts 2/ . . . . .	43,306	35,733	16,961
West Coast 3/ . . . . .	3,639	1,998	1,529
Total . . . . .	46,945	37,731	18,490
Jan.-July 1965			
Total . . . . .	134,966	112,003	52,950
Jan.-July 1964			
Total . . . . .	141,827	112,402	57,039
1/Does not include crab meal, shrimp meal, and liver oils.			
2/Includes a small quantity from the Great Lakes.			
3/Includes American Samoa and Puerto Rico.			

Association of Fish Meal Manufacturers are shown in the table.

\* \* \* \* \*

Major Indicators for U. S. Supply, June 1965: United States production of fish meal and fish oil in June 1965 was lower by 6.8 and 6.4 percent, respectively, as compared with June 1964. Production of fish solubles was lower by 8.2 percent.

Major Indicators for U. S. Supply of Fish Meal, Solubles, and Oil, June 1965					
Item and Period	1/1965	1964	1963	1962	1961
Fish Meal:	(Short Tons) . . . . .				
Production:					
June	45,605	48,953	34,863	61,171	54,399
Jan.-June 2/	88,021	96,651	91,079	121,836	102,502
Year 3/	-	235,252	255,907	312,259	311,265
Imports:					
June	44,474	34,515	18,452	26,453	19,317
Jan.-June	209,858	256,429	181,934	140,886	107,826
Year	-	493,143	376,321	252,307	217,845
Fish Solubles 4/:					
Production:					
June	17,329	18,873	15,430	24,725	17,772
Jan.-June 2/	34,460	39,025	42,825	51,487	40,200
Year 3/	-	93,296	107,402	124,649	112,254
Imports:					
June	224	249	323	872	207
Jan.-June	3,230	2,051	2,439	4,290	1,219
Year	-	4,505	7,112	6,308	6,739
Fish Oil:					
Production:					
June	40,124	42,861	28,193	54,924	49,686
Jan.-June 2/	74,272	78,624	69,589	96,522	89,025
Year 3/	-	180,198	185,827	250,075	258,118
Exports:					
June	18,111	117	255	4,921	21,035
Jan.-June	30,170	56,139	97,806	63,005	68,128
Year	-	151,469	262,342	123,050	122,486
1/Preliminary.					
2/Data for 1965 based on reports which accounted for the following percentage of production in 1964: Fish meal, 89 percent; solubles, 89 percent; and fish oils, 99 percent.					
3/Small amounts (10,000 to 25,000 tons) of shellfish and marine animal meal and scrap not reported monthly are included in annual totals.					
4/No homogenized fish was produced in 1964 or during the first 6 months of 1965.					

\* \* \* \* \*

Production, June 1965: During June 1965, a total of 45,605 tons of fish meal and 40.1 million pounds of marine-animal oil was produced in the United States. Compared with June 1964 this was a decrease of 3,348 tons of fish meal and about 2.7 million pounds of marine-animal oil. Fish solubles production amounted to 17,329 tons--a decrease of 1,544 tons as compared with June 1964.

U. S. Production of Fish Meal, Oil, and Solubles, June 1965 1/ with Comparisons				
Product	June		Jan.-June	
	1/1965	1964	1/1965	1964
(Short Tons) . . . . .				
Fish Meal and Scrap:				
Herring	1,041	1,228	2,392	1,643
Menhaden 2/	38,478	39,683	64,476	65,430
Tuna and mackerel	2,398	2,347	11,397	8,832
Unclassified	3,688	5,695	9,756	20,746
Total	45,605	48,953	88,021	96,651
Shellfish, marine-animal meal and scrap	3/	3/	3/	3/
Grand total meal and scrap	3/	3/	3/	3/
Fish Solubles:				
Menhaden	14,883	15,819	25,072	26,588
Other	2,446	3,054	9,388	12,437
Total	17,329	18,873	34,460	39,025
(1,000 Pounds) . . . . .				
Oil, body:				
Herring	431	2,089	1,013	2,221
Menhaden 2/	38,463	39,599	69,919	71,142
Tuna and mackerel	326	381	1,684	1,508
Other (including whale)	904	792	1,656	3,753
Total oil	40,124	42,861	74,272	78,624
1/Preliminary data.				
2/Includes a small quantity of thread herring.				
3/Not available on a monthly basis.				

\* \* \* \* \*

#### U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-June 1965: Based on domestic production and imports, the United States available supply of fish meal for the first 6 months in 1965 amounted to 297,879 short tons--55,201 tons (or 15.6 percent) less than during the same period in 1964. Domestic production was 8,630 tons (or 8.9 percent) less, and imports were 46,571 tons (or 18.2 percent) lower than in January-June 1964. Peru continued to lead other countries with shipments of 178,856 tons.

The United States supply of fish solubles during January-June 1965 amounted to 37,690 tons--a decrease of 8.2 percent as compared with the same period in 1964. Domestic production dropped 11.7 percent, but imports of fish solubles increased 57.5 percent.

U. S. Supply of Fish Meal and Solubles, January-June 1965			
Item	Jan.-June		Total 1964
	1/1965	1964	
. . . . . (Short Tons). . .			
<b>Fish Meal and Scrap:</b>			
<b>Domestic production:</b>			
Menhaden . . . . .	64,476	65,430	160,349
Tuna and mackerel . . . . .	11,397	8,832	21,113
Herring . . . . .	2,392	1,643	8,881
Other . . . . .	9,756	20,746	44,909
Total production . . . . .	88,021	96,651	235,252
<b>Imports:</b>			
Canada . . . . .	20,875	30,015	54,769
Peru . . . . .	178,856	205,135	348,025
Chile . . . . .	5,128	10,036	12,942
So. Africa Rep. . . . .	1,900	9,538	18,581
Other countries . . . . .	3,099	1,705	4,826
Total imports . . . . .	209,858	256,429	439,143
Available fish meal supply	297,879	353,080	674,395
<b>Fish Solubles:</b>			
<b>Domestic production 2/. . .</b>			
	34,460	39,025	93,296
<b>Imports:</b>			
Canada . . . . .	915	1,031	1,553
So. Africa Rep. . . . .	-	780	987
Other countries . . . . .	2,315	240	1,965
Total imports . . . . .	3,230	2,051	4,505
Available fish solubles supply	37,690	41,076	97,801
1/ Preliminary.			
2/ 50-percent solids.			

1/ Preliminary.  
2/ 50-percent solid.



## Maine Sardines

### CANNED STOCKS, JULY 1, 1965:

Canners' stocks of Maine sardines on July 1, 1965, were down sharply from those of the same date in 1964 and 1963. But by the end of July 1965, the current season's pack was ahead of that in July 1964.

The new Maine sardine-canning season opened on the traditional date of April 15, 1965, and the pack to August 7, 1965, totaled 689,579 standard cases, as compared with a pack of 409,536 cases for the same period in 1964. Herring landings increased sharply in the last week of July 1965, and the 22 active Maine sardine canneries were packing. Landings continued good into early August. The herring were of good size and excellent quality.

When the new season began on April 15, 1965, there was at the canners' level a carry-over of 290,000 cases. Through July 1, 1965, the 1965 pack season had yielded 241,000 cases.

The new law legalizing year-round canning of Maine sardines will remove the traditional December 1 closing date for the packing season. The new legislation will open winter canning to all Maine sardine packers and will allow winter canning with domestic as well as imported herring.

Final data showed the 1964 pack as 865,751 standard cases (100 cans of 3 $\frac{3}{4}$ -oz.) canned in 23 plants in Maine. That was much less than the 1,619,000 cases packed during 1963, but more than the 754,000 cases packed during the regular season in 1961 when fishing was extremely poor.

Note: See *Commercial Fisheries Review*, Aug. 1965 p. 43.



## Marketing

### EDIBLE FISHERY PRODUCTS, FIRST HALF 1965:

United States per capita consumption of fishery products during the first half of 1965 dropped below that of a year earlier and retail prices averaged a little higher. Lower domestic landings and smaller stocks of frozen edible fishery products on hand at the beginning of the year contributed to the drop in available supplies.

As the second half of 1965 began, frozen stocks of fishery products were substantially below a year earlier. Fillets and steaks of cod, flounder, ocean perch, and fish sticks and portions were below the same period a year earlier. Except for scallops, frozen stocks of other shellfish products on July 1, 1965, were down.

United States fishery landings are expected to rise seasonally in the third quar-

Canned Maine Sardines--Wholesale Distributors <sup>1</sup> and Canners <sup>1</sup> Stocks, July 1, 1965, with Comparisons 1/											
Type	Unit	1964/65 Season					1963/64 Season				
		7/1/65	6/1/65	4/1/65	1/1/65	11/1/64	7/1/64	6/1/64	4/1/64	1/1/64	11/1/63
Distributors	1,000 actual cases	194	198	236	238	291	234	254	291	261	308
Canners	1,000 std. cases 2/	295	203	314	538	629	514	499	658	1,063	1,255

1/ Table shows marketing season from November 1–October 31.

2/ 100 3½-oz. cans equal 1 standard case.

Source: U. S. Bureau of the Census, Canned Food Report, July 1, 1965.

1/ Table shows marketing season from November 1-October 31.

2/ 100 3 $\frac{3}{4}$ -oz. cans equal 1 standard case.

Source: U. S. Bureau of the Census, *Canned Food Report*, July 1, 1965.

ter of the year when about 40 percent of the annual U. S. fishery catch for human food will be landed. Shrimp landings in the third quarter will rise seasonally and the catch will probably be above 1964. The 1965 red salmon fishing season is nearly ended; preliminary data show a much larger pack this year than in 1964. Supplies of many other popular fishery products will remain smaller, however, than during July-September 1964. Retail prices of fishery products will likely average a little higher than in 1964.



In the older of the two main sheds of Fulton Fish Market, New York City, journeyman in foreground is transporting a box of salt-water fish to truck for delivery.

According to the U. S. Bureau of Labor Statistics, retail prices for selected fishery products were higher in January-June 1965 than in the same 6 months of 1964. Prices were up 4.7 percent for frozen packaged shrimp (10-oz.); 0.6 percent for fresh or frozen fish; 0.6 percent for canned tuna (6½-oz.); and 4.6 percent for canned sardines (3¼-oz.).

Note: This analysis was prepared by the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the Department of Agriculture's August 1965 issue of *National Food Situation* (NFS-113).



## Mississippi

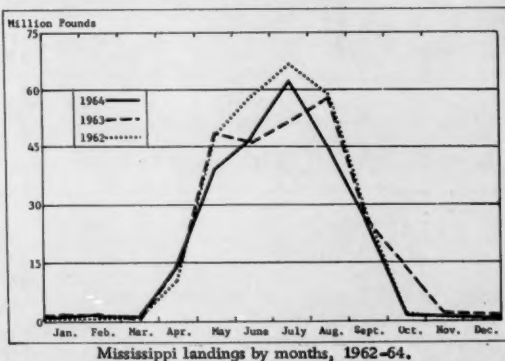
### LANDINGS AND FISHERY TRENDS, 1964:

In 1964, commercial fishermen of the Mississippi Gulf Coast landed 331.9 million pounds of fish and shellfish with an ex-vessel value of \$8.0 million. Compared with the previous year, that was a decline of 3 percent in quantity and 6 percent in value. Menhaden, red snapper, shrimp, oysters, and crab continued to be the leading species in the catch.

**Finfish:** Food fish landings of 3.1 million pounds valued at \$579,000 in 1964 were about the same as in the preceding year. Red snapper was the major item in those landings. Several of the snapper vessels made trips to new fishing grounds in the Caribbean off the coast of Honduras during December 1964. The initial trips had some gear difficulty, but good fishing areas were found.

Industrial fish landings of 316.3 million pounds valued at \$4.5 million made up 99 percent of the total finfish landings in 1964. Otter-trawl industrial landings (78.4 million pounds valued at \$1.3 million) went mainly to petfood canning plants. Menhaden landings (for meal and oil) in 1964 of 237.8 million pounds valued at \$3.1 million were generally at normal levels, although down 5 percent in quantity from the previous year.

The high-volume menhaden fishery is supported by an abundant resource and mechanized equipment. Large-capacity refrigerated vessels using hydraulic blocks for net handling, and large fish pumps to move fish from the purse seine into the hold of the vessel are now standard in the menhaden fleet. Spotter planes work closely with the fleet. The pilot of a spotter plane guides and directs the actual setting of the net from a purse-seine vessel via radio communication. Each menhaden plant now uses two or more spotter planes for their fleet operations.



**Shellfish:** Shrimp landings in 1964 of 6.4 million pounds (heads-on weight) valued at \$1.8 million were down 31 percent in quantity and 27 percent in value from the previous year. Catches were down in the summer brown shrimp fishery as well as the fall white shrimp fishery.



Oyster landings of 4.8 million pounds of meats were slightly above the 1963 harvest and represented another good year of production with Mississippi reefs again producing most of the oysters. Oysters landed from Mississippi reefs during the 1964 dredging season were of better quality than the previous year with a subsequent higher yield of meat which increased their value. Raw oyster trade was steady during the year with normal seasonal market fluctuations.

Mississippi Landings, 1964 and 1963				
Species	1964		1963	
<b>Fish</b>	<b>Lbs.</b>	<b>\$</b>	<b>Lbs.</b>	<b>\$</b>
Bluefish . . .	14,630	1,463	4,600	460
Cabio . . . .	900	71	2,900	227
Croaker . . .	500	30	2,600	141
Drum:				
Black . . . .	45,730	3,060	16,900	1,258
Red or redfish	49,950	7,187	59,000	7,471
Flounders . .	57,345	7,810	59,300	7,203
Groupers . . .	268,350	29,302	271,400	29,859
King whiting or kingfish . .	322,960	19,802	256,600	16,077
Menhaden . .	237,832,600	3,131,440	250,429,200	3,276,215
Mullet . . . .	249,530	12,391	382,200	19,561
Pompano . . .	200	100	300	86
Sea Catfish . .	16,650	836	12,700	618
<b>Sea trout:</b>				
Spotted . . .	148,130	30,522	80,300	20,074
White . . . .	26,150	1,399	68,200	3,745
Sheepshead . .	49,300	3,847	29,700	2,341
Snapper, Red .	1,849,190	460,872	1,885,800	471,397
Spanish mackerel . . . .	660	62	1,500	151
Spot . . . . .	7,200	540	4,400	257
Unclassified, Industrial use	78,425,210	1,348,925	72,576,600	1,210,320
<b>Total Fish . .</b>	<b>319,365,185</b>	<b>5,059,659</b>	<b>326,144,200</b>	<b>5,067,461</b>
<b>Shellfish</b>				
<b>Crabs, Blue:</b>				
Hard . . . . .	1,285,980	81,610	1,112,000	63,633
Soft and peeler . . .	1,700	252	2,700	466
<b>Shrimp, heads-on . .</b>	<b>6,416,024</b>	<b>1,804,829</b>	<b>9,374,700</b>	<b>2,484,195</b>
<b>Oysters . . . . .</b>	<b>4,828,600</b>	<b>1,098,736</b>	<b>4,679,500</b>	<b>975,115</b>
<b>Total shellfish</b>	<b>12,532,304</b>	<b>2,985,427</b>	<b>15,168,900</b>	<b>3,523,409</b>
<b>Grand Total . .</b>	<b>331,897,489</b>	<b>8,045,086</b>	<b>341,313,100</b>	<b>8,590,870</b>

Note: The catch of oysters and shrimp taken in Louisiana waters but landed in Mississippi is included. Oysters are reported in pounds of meats (8.75 pounds per gallon). In 1964, the weight of oyster meats was converted from Mississippi barrels of oysters by multiplying by 15.7. All other species are shown in round weight.

Hard blue crab landings increased for the second consecutive year in 1964 with landings of 1.3 million pounds. A strong demand for crabs throughout the year was a major factor in the increased landings.

Mississippi boatyards were busy during the year with orders for a variety of fishing vessels for local and out-of-State owners.



## National Fisheries Center and Aquarium

### DIRECTOR NAMED BY SECRETARY OF THE INTERIOR:

The appointment of Dr. Warren Jensen Wisby as Director of the new National Fisheries Center and Aquarium planned for Washington, D. C., was announced by Secretary of the Interior Stewart L. Udall, August 23, 1965.

Wisby who assumed his new post in September 1965, has been associated with the



Dr. Warren Jensen Wisby.

University of Miami's Institute of Marine Sciences since 1959 as a researcher, teacher, administrator, and as a designer of its new laboratory building. Concerned primarily with the study of the behavior and sensory physiology of marine organisms, his research projects have included hearing

and color vision in the lemon shark, hearing and allied senses in fish, and behavioral changes in fish resulting from simulated weightlessness. His shark projects and his work in oceanography were subjects of national and local television programs. As a research associate with the University of Wisconsin from 1952 to 1959, he directed graduate students studying the behavior of fresh-water fish and salmon.

The \$10 million National Fisheries Center and Aquarium, scheduled to be built in East Potomac Park by 1968, will be one of the world's largest and most complete installations for exhibiting and studying aquatic life. Operated by Interior's Bureau of Sport Fisheries and Wildlife, it will display in natural surroundings more than 1,000 species of fish, amphibians, and invertebrates. There will be a trout stream, a Gulf bayou, and tanks designed especially for tropical fish and dolphins.

The installation will have facilities and specimens to aid aquatic research in such



diverse fields as fish diseases, behavior of aquatic organisms, nutrition of fish, and medical values of antibiotics produced by marine animals.

The Fisheries Center is distinctive among Federal institutions because it will repay both construction and operational costs by nominal admission charges.

Note: See Commercial Fisheries Review, December 1964 p. 48.



## National Fisheries Institute

### NATIONWIDE PROMOTIONS FOR

OCTOBER 1965

#### FISH 'N SEAFOOD PARADE:

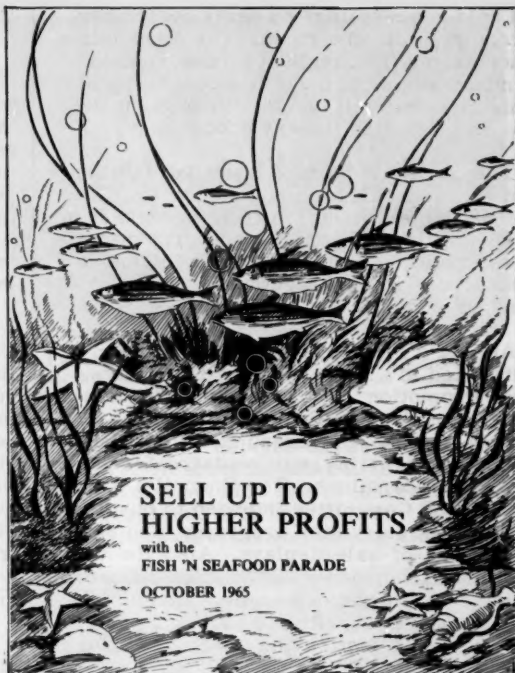
Luncheons and dinners in observance of "Fish 'n Seafood Parade" during October were scheduled in many regions of the United States. Point-of-sale display materials were distributed; local newspaper, radio and TV advertising was scheduled--all to tie in with the annual national campaign sponsored by the National Fisheries Institute (NFI), in cooperation with the U. S. Bureau of Commercial Fisheries.

According to the chairman of the Fish 'n Seafoods Promotions Division of NFI, "The Parade represents a high point in the fishing industry's promotion plans, when it is possible--through the cooperation of many interests--to bring to the consuming public the great varieties of seafoods available today."

Chicago's Seafood Club gave a dinner for press, trade, and industry representatives, at which there was a display of merchandising materials. Actual marketing and merchandising of fishery products were discussed.

Active on the West Coast were northern and southern California groups and the Northwest Fisheries Association. NFI members in northern California formed the Seafood Educational Association. The Association sponsored a buffet luncheon for the press, distributed display materials, and followed through with publicity and advertising in local newspaper and radio media.

The Southern California Fisheries Association's press party was given on October 12 at Cigo's Restaurant in San Pedro. Spe-



Motif being used for the fall 1965 "Fish 'n Seafood Parade."

cial features were a certificate for each guest which could be redeemed for a package of seafood specialties, and a question-and-answer period in which guests answered, "What can our association do to help you know more about seafoods and the fishing industry."

The chairman of Northwest Fisheries Association's Fish 'n Seafood Parade says that their promotion was in four parts: (1) a Fish 'n Seafood Sweepstakes Contest; (2) an in-store-display contest; (3) a kick-off banquet in September; and (4) a promotional campaign in which advertising was scheduled for local newspapers, radio, and television.

In the East and South, Boston, New York City, Philadelphia, Nashville, Atlanta, and Florida cities had Parade activities of their own. The chairman of the Boston group says that their Parade dinner was given at Anthony's Pier 4 on October 4. Guests were members of the press, radio, television, as well as restaurant owners, industry men, and chainstore executives.

The Delaware Valley Fish and Seafood Association, recently organized in Philadelphia,

had held two meetings by early September, according to its chairman. The Association concentrated first on the October Parade. Members intend to make it a continuing organization that will function throughout the year in promoting fishery products.

The Nashville Seafood Association's banquet was scheduled for September 15. The Association expected 115 to 120 guests from the fishing industry, chain stores, restaurants, press, radio, and television. The principal speaker was F. P. Longeway, Jr., general manager of NFI.

Atlanta's Fish 'n Seafood Parade Committee tied in with the Frozen Food Buy-Time Promotion. Those two groups formed the Frozen Food Council of Georgia, according to the U. S. Bureau of Commercial Fisheries marketing representative for Georgia and the Carolinas. The Council's Fish and Seafood Committee intended to buy time on radio and television programs, and purchase point-of-sale displays. Also, the North Carolina Fishermen's Association sponsored a Seafood Editors Conference, October 20-22, in cooperation with the Southeastern Fisheries Association and the State of North Carolina.

Further south, the executive secretary of the Southeastern Fisheries Association reports that chairmen for the Miami, Tampa, and Jacksonville areas of Florida were appointed, and that the Association ordered display materials. The Association's executive secretary said, "We intend to hold some kind of seafood dinner in each of the metropolitan areas of the State during October. These dinners will be in addition to the annual seafood promotion dinner sponsored by the Association."

Notes: (1) For further details write to Fish 'n Seafoods Promotions Division, National Fisheries Institute, 1614 Twentieth Street, NW., Washington, D.C. 20009.

(2) See Commercial Fisheries Review, Aug. 1965 p. 44.



## New England

### REPORT ON ADVANTAGES OF STERN TRAWLING ISSUED BY FEDERAL RESERVE BANK OF BOSTON:

A new technological development applied to commercial fishing in New England may slow or reverse the declining trend of this regional industry, according to a report pub-

lished in the Federal Reserve Bank of Boston's August 1965 Business Review.

A new technique known as "stern trawling," whereby nets and gear are operated from the stern of the vessel rather than from the side as in conventional trawling, may increase the industry's productivity, raise wages and the return on capital, reduce the hazards of fishing, and greatly improve the New England fishing industry's competitive position as against foreign imports of fishery products, the bank said.

In the first of a two-part study of the New England fishing industry, the Boston Reserve Bank reports its study of the 74-foot fishing vessel Narragansett, the first stern trawler in New England's fishing industry. Over a period of nine months, according to the bank's report, this vessel's average catch per trip was more than 70,000 pounds, about 29 percent higher than the average for a comparable group of vessels using the conventional trawling method. In addition, the Narragansett needed only 7 men in the crew as against an average of 9 on side trawlers.

The report said the Narragansett yielded about \$1,731 more in revenue per trip. Its crew members received an average of \$8,350 in wages for the 9 months, compared to an average of \$5,040 for crew members of the side trawlers. It pointed out that "The results of statistical tests indicated that the stern trawling technique made a significant difference in productivity between the Narragansett and the control group vessels."

The report also cited the results of similar experiments conducted by the Department of Fisheries of New Brunswick, Canada, which showed that stern trawlers "were more seaworthy and allowed more rapid handling of the gear. As a result, stern trawlers were on the average able to catch 20 percent more fish per trip." A survey conducted by the bank of foreign owners of stern trawlers confirmed those findings.

The Reserve Bank's questionnaire survey of vessel owners in New England indicated that 60 percent of that region's fishermen feel stern trawlers would be more productive. But the ultimate economic feasibility of stern trawling, the report pointed out, depends on construction costs. A survey of shipbuilders showed that costs for a stern trawler would be about 20 percent higher than for a side

trawler, and this additional cost increases depreciation and interest payments along with the size of the initial down-payment required.

The report concludes with "However, the smaller crew on a stern trawler decreases protection and indemnity insurance costs. Altogether, the stern trawler's higher productivity should offset its higher construction costs, resulting in a greater return on invested capital."

In the second part of the study the Reserve Bank plans to evaluate the 1964 Fishing Fleet Improvement Act as a means of financing this new fishing technology. (Federal Reserve Bank of Boston, August 23, 1965.)



## North Atlantic

### SOVIET FISHING ACTIVITY OFF COAST, AUGUST 1965:

Because Georges Bank was blanketed by dense fog during most of August, aerial observations were restricted and only a limited assessment of Soviet fishing activity was possible. The observations were made by the staff of the Fisheries Resource Management Office, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., which conducts weekly reconnaissance flights cooperatively with the U. S. Coast Guard. It was estimated that in August the Soviet fishing fleet on Georges Bank did not exceed 75 vessels. Of those, 53 were sighted and identified as 19 fish factory stern trawlers, 26 side trawlers, 7 processing and refrigerated transports, and 1 tug. This compares with 100 vessels sighted during their peak in July 1965 and 137 vessels in August 1964.

Soviet fishing operations during the month generally ranged from the Cultivator Shoals to the "southeast part" of Georges Bank, 100 to 150 miles east of Cape Cod. Although most of the vessels were actively engaged in fishing operations, only moderate catches, consisting mostly of whiting, were observed being taken. Toward the end of the month the main Soviet fleet continued to operate in waters adjacent to Nova Scotia and Newfoundland. Those areas are known for their abundance of whiting.

There was no indication that the Soviets were preparing any major emphasis for tak-



Fig. 1 - Soviet processing factory stern trawler *Grumant* (Skryplev class). Six vessels of this type were operating on Georges Bank during August 1965.

ing herring. It is possible that environmental changes may have delayed the development of that fishery. At about the same time a year earlier, a fleet of about 175 vessels converged on the Georges Shoals area and took very large catches of herring at their spawning stage.



Fig. 2 - Deck view of Soviet processing factory ship *Matochkin Shar* while on Georges Bank. This is one method the Soviets use in handling the fish catch from "Pioneer class" side trawlers. The fish are bundled in sections of netting and then hoisted over the side or pulled in through a stern opening.

In addition to the Soviet vessels, a stern trawler from Poland and another from Romania were fishing on Georges Bank during August.

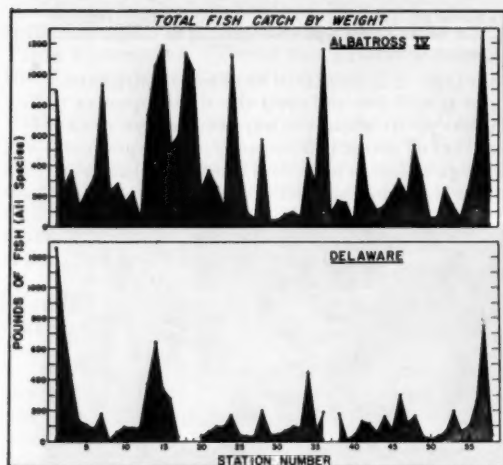
Note: See *Commercial Fisheries Review*, September 1965 p. 34.



## North Atlantic Fisheries Explorations and Gear Development

### SAMPLING EFFICIENCY TESTS OF TWO RESEARCH VESSELS:

M/V "Delaware" Cruise 65-6 (July 8-15, 1965): To compare the sampling efficiency of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware with that of the Bureau's research vessel Albatross IV was the purpose of this cruise. The Delaware accompanied the Albatross IV for 7 days during the latter vessel's regular summer investigations (Cruise 65-10) in July-August.



Comparison of fish catches during sampling efficiency cruises by M/V Delaware and M/V Albatross IV.

Both vessels occupied a total of 58 fishing stations during this part of the cruise. Each vessel set its gear at approximately the same time and made parallel 30-minute tows, generally within  $\frac{1}{2}$  mile of each other. All fish caught were identified, weighed by species, and measured. Haddock scale samples were taken and fish stomachs were examined from as many stations as possible. Abnormally pigmented blackback flounders were frozen and returned to the Bureau's Biological Laboratory at Woods Hole, Mass. One large white hake weighing 46 pounds and measuring 127 centimeters (50 inches) in length was frozen and returned to the laboratory.

Data obtained on the cruise showed that the Albatross IV caught more fish, by weight than the Delaware at 80 percent of the stations. Species composition of the Albatross

IV catches was also greater than Delaware catches.



## North Atlantic Fisheries Investigations

### BUREAU OF COMMERCIAL FISHERIES RESEARCH VESSEL HOLDS OPEN HOUSE:

M/V "Albatross IV" Cruise 9 (June 25-27, 1965): The research vessel Albatross IV, operated by the U. S. Bureau of Commercial Fisheries, was open to the public on June 26, 1965, at the Port of Gloucester, Mass., as part of that port's annual "Blessing of the Fleet" celebration. The open house attracted about 700 visitors who were invited to tour the vessel. Various displays were set up for the occasion in the vessel laboratories, and the closed circuit television system with which the vessel is equipped was in operation.

The visitors were interested in looking over the vessel facilities and learning more about the fishery research being done.

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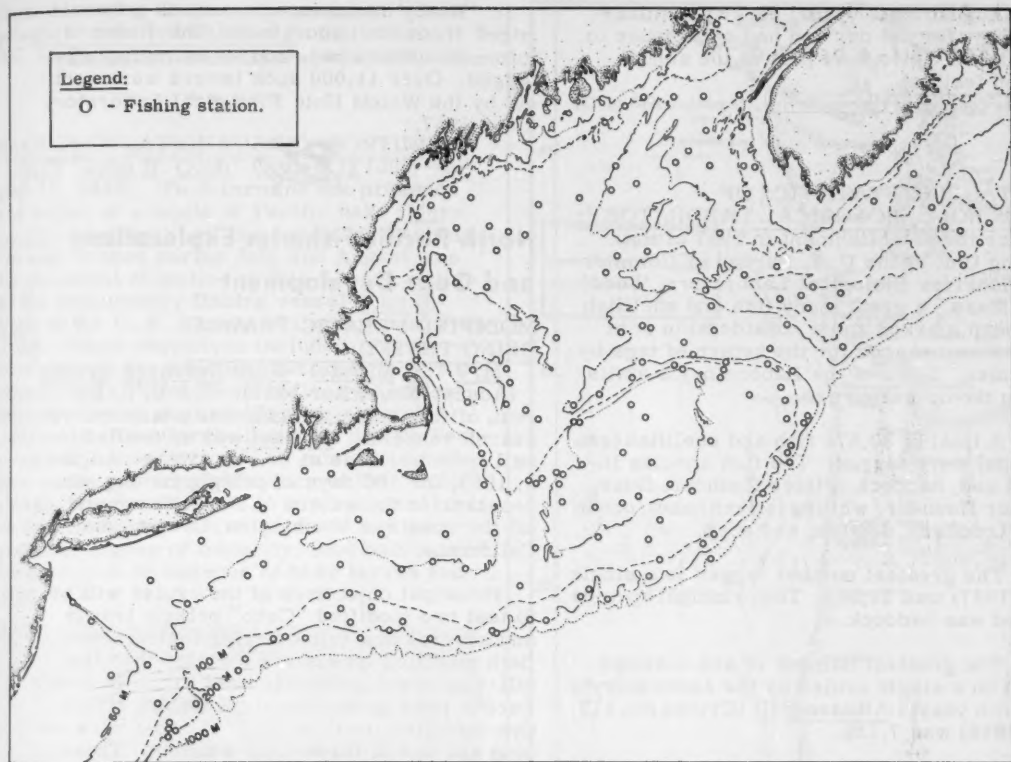
### SUMMER DISTRIBUTION AND ABUNDANCE OF GROUND FISH SPECIES STUDIED:

M/V "Albatross IV" Cruise 65-10--Part I (July 7-21); Part II (July 28-August 10, 1965): To determine the summer distribution and relative abundance of groundfish species from the Bay of Fundy southward to Hudson Canyon was the main objective of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Albatross IV. Another objective was to compare the sampling efficiency of the Bureau's exploratory fishing vessel Delaware with that of the Albatross IV.

The cruise was conducted in two parts. The first part was from the Bay of Fundy southward to include the Gulf of Maine, Browns Bank, and part of Georges Bank. During the first 7 days of the cruise both vessels towed side by side to compare groundfish catches.

A total of 189 otter trawl stations were occupied during the cruise and all fish caught were identified and measured. Other activities included: (1) total weight by species was obtained from each tow; (2) stomach contents of a number of species were examined and recorded; (3) length-weight data from selected species were obtained; (4) scale samples were taken from haddock, yellowtail





Shows fishing stations worked during Albatross IV Cruise 65-10 (July-August 1965).

flounder, and silver hake; (5) otoliths were extracted from whiting (silver hake), red hake, and white hake; (6) invertebrates caught in each tow were preserved.

Selected fish species were preserved during the cruise for the collection at Syracuse University, and samples of sea herring were collected for the Bureau's Biological Laboratory, Boothbay Harbor, Me. A number of midwater tows were made with the Isaacs-Kidd trawl, and collections of intestines from selected species were made by personnel from the Massachusetts Institute of Technology in the study of the occurrence of botulism organisms in marine fishes. Bathythermograph casts were made at each station and between stations.

Adult haddock were caught from Georges Bank northward at almost every station in depths less than 80 fathoms, with the largest concentrations of them on Georges Bank. Young haddock were caught with the bottom

trawl in the southern New England area only. Cod were abundant on Browns Bank and at one station off the Maine Coast. Ocean perch were found in deep water throughout the Gulf of Maine, with the largest catch made along the eastern side of Nova Scotia. Whiting (silver hake) were distributed throughout the sampling area in varying numbers. The best catch of that species was in the southern New England area and along the Maine Coast. Good catches of pollock were made at several stations in the Gulf of Maine and on Browns Bank. Spiny dogfish were concentrated on Stellwagen Bank and on Nantucket Shoals.

Tows with the Isaacs-Kidd mid-water trawl were made off Cape Cod, western Nova Scotia, the Northeast Peak of Georges Bank, and around the Hudson Canyon primarily to obtain young-of-the-year haddock. Young haddock between 3 to 7 centimeters (1.2 to 2.8 inches) in length were caught in midwater only around the Hudson Canyon area. Other species such as ocean perch, hake, and butterfish were also taken in mid-water.



On August 7 the vessel docked at Rockland, Me., for the day and had open house to about 1,100 visitors as part of the annual seafood festival.

Note: See Commercial Fisheries Review, November 1965 p. 43.

\* \* \* \* \*

#### FISH TAGGING STATISTICS OF WOODS HOLE BIOLOGICAL LABORATORY:

Since the establishment in 1957 of the Tagging Unit at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Woods Hole, Mass., a great many fish and shellfish have been marked and a considerable sum paid out as rewards for the return of tags by fishermen. Some of the Laboratory's statistics on the operation are:

1. A total of 80,576 fish and shellfish (sea scallops) were tagged. The fish species included cod, haddock, winter flounder, fluke, summer flounder, whiting (silver hake), ocean perch (redfish), dogfish, and scup.

2. The greatest number tagged in a single year (1957) was 21,342. The principal species marked was haddock.

3. The greatest number of sea scallops tagged on a single cruise by the Laboratory's research vessel Albatross III (Cruise No. 113, June 1958) was 7,539.

4. Alewife, winter flounder, fluke, and scup were tagged by various State biologists in cooperative programs with the Woods Hole Biological Laboratory. In all, 13,881 fish were tagged on that basis.

5. The Laboratory has been cooperating with the Commonwealth of Massachusetts on a winter flounder tagging program. Over 10,000 fish were marked as of July 1965, of which 2,381 tags were returned by that time.

6. The total amount paid in rewards since 1957 was \$14,479 as of July 1965. The greatest amount in a single year (1964) was \$3,223. For the most part the rewards were paid directly to fishermen by the Bureau's port agents.

7. Fishermen and plant workers of New Bedford, Mass., received the greatest share of reward payments--\$5,012 or 36 percent of the total amount.

8. Every documented return is acknowledged from the Laboratory. The finder is informed about where and when the fish was tagged. Over 11,000 such letters were sent out by the Woods Hole Biological Laboratory since 1957.



### North Pacific Fisheries Explorations and Gear Development

#### MODIFIED PELAGIC TRAWLS BEING TESTED:

M/V "St. Michael" Gear Research Cruise 7 (August-November 1965): The U. S. Bureau of Commercial Fisheries chartered research vessel St. Michael was scheduled to sail from her base at Seattle, Wash., August 5, 1965, for 100 days of pelagic fishing gear research in the waters of Puget Sound and off the coasts of Washington, Oregon, and California.

Principal objectives of the cruise will be to test two modified "Cobb" pelagic trawls and several new telemetering instruments. Both modified trawls are smaller than the full-size trawl presently used in the Bureau's Pacific hake production-type fishing trials. One modified trawl is made of two-inch webbing and one of three-inch webbing. Those nets were designed to reduce trawl drag and gilling of hake.

Several new instruments will be tested during this cruise. A catch load indicator will show the amount of fish in the cod end while the net is being towed; an echo-sounder transducer will be mounted on the trawl headrope; and a mercury switch will turn on a light in the pilothouse when the trawl foot-rope is a prescribed distance from the bottom. The trawl depth sensors will be connected to the trawl instead of to the hydrofoil trawl boards. Tests will continue on a wireless depth indicator.

The modified "Cobb" pelagic trawls and telemetering instruments will first be tested in Puget Sound. Comparison tows will then be made alongside the chartered trawler Western Flyer, which will be towing a full-size "Cobb" pelagic trawl and using the depth telemetering system with the sensors mounted just ahead of the hydrofoil trawl boards. SCUBA-equipped divers will spend several

days observing the two new modified "Cobb" pelagic trawls to be tested on the cruise.

Note: See Commercial Fisheries Review, February 1965 p. 35.

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#### HAKE POPULATION SURVEY CONTINUED:

M/V "John N. Cobb" Cruise 72 (July-August 13, 1965): To determine the presence and extent of schools of Pacific hake (*Merluccius productus*) off the coasts of Washington and Oregon during July and August was the principal objective of this 6-week cruise by the exploratory fishing vessel John N. Cobb of the U. S. Bureau of Commercial Fisheries. Other objectives included: (1) to record data on the seasonal availability of Pacific hake in Puget Sound collected incidentally to a spiny dogfish (*Squalus acanthias*) collecting effort for the Bureau's Seattle Technological Laboratory; (2) to gain additional data on the catching efficiency of the "Cobb" pelagic trawl; and (3) to obtain biological data on Pacific hake, such as size and sex composition, degree of maturity, food habits, and the presence or absence of hake larvae and eggs.

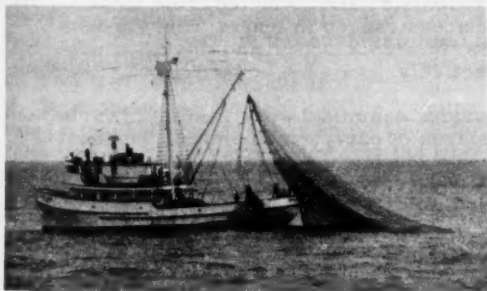


Fig. 1 - M/V John N. Cobb of the U.S. Bureau of Commercial Fisheries hauling in the large pelagic trawl.

Initial plans to survey waters off California were changed to permit intensified coverage between Grays Harbor, Wash., and the Columbia River where the Bureau's chartered research vessel Western Flyer was engaged in commercial-type hake fishing trials.

**GEAR USED:** The principal gear used during the first half of the cruise was a standard Mark II "Cobb" pelagic trawl constructed of 3-inch mesh monofilament webbing. The principal gear used during the second half of the cruise was a standard Mark II "Cobb" pelagic trawl constructed of 3-inch mesh multifilament (12 thread) webbing. Both

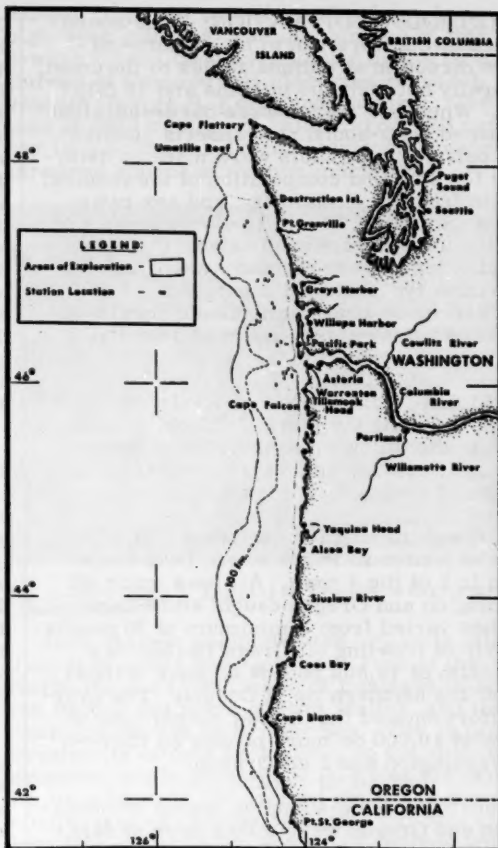


Fig. 2 - Areas of exploration during M/V John N. Cobb Cruise 72 (July 7-August 13, 1965).

trawls were fished with two aluminum hydrofoil-type otter boards on 60-fathom bridles. To facilitate the retention of smaller organisms, both trawls were equipped, on most tows, with a 12-foot marlon liner constructed of  $\frac{9}{16}$ -inch mesh webbing.

Fishing depth of the net was monitored using a dual electrical depth telemetering system having a depth sensing unit housed at the terminus of each electrical towing cable. In addition, a Furuno depth sensing unit was attached to the trawl headrope (4 hauls only); used with a hydrophone the unit similarly permitted a pilothouse read-out of gear depth. A high-resolution, low-frequency echo-sounder was used to locate fish schools. Other gear used included a one-meter plankton net and a 900-foot range bathythermograph (BT).

**METHODS OF OPERATION:** Echo-sounding transects were run in an onshore-off-shore direction at oblique angles to the coast, generally between 200 fathoms and 30 fathoms. When fish traces were observed, closely spaced echo-sounding transects coupled with pelagic trawl hauls were made to determine the size and composition of the schools. Length frequency, maturity, and sex ratio data were obtained from random samples of about 150 hake from each catch. cursory examination of hake stomachs was made to determine types of food organisms. A BT cast was made after each pelagic trawl haul and plankton tows were made at selected localities.

**PELAGIC TRAWLING:** A total of 29 drags was made using the Mark II "Cobb" pelagic trawl in the following areas: Puget Sound (4 drags), off Washington (16 drags), and off Oregon (9 drags).

Although fishing for dogfish was the primary objective in Puget Sound, hake were taken in 2 of the 4 tows. All tows made off Washington and Oregon caught some hake. Catches varied from a minimum of 30 pounds an hour of trawling off Grays Harbor to a maximum of 12,800 pounds an hour of trawling off the northern tip of Oregon. The overall effort showed that 8 tows caught hake at a rate of 10,000 or more pounds an hour--6 off Washington and 2 off Oregon.

Generally, echo-sounding traces off Washington and Oregon were either poor or fair to good when compared to traces observed on previous cruises. The exception was on July 21 while transecting between the 210- and 30-fathom contours just north of the California-Oregon border when excellent traces were observed between 65 and 48 fathoms. Those traces appeared about 6 fathoms above bottom. Due to heavy seas it was not possible to fish the pelagic trawl on that date. Fair echo-sounding traces were observed WNW. of Destruction Island between 86 and 40 fathoms. The area between Destruction Island and Point Grenville, Wash., showed weak traces between 275 and 38 fathoms with occasional fair to good traces centered between the 81 to 46 fathom contours. Sounding transects taken between Grays Harbor and the Columbia River Lightship showed patches of fair to good traces, suggestive of Pacific hake, centered between the 70- to 31-fathom contours. Some good traces appeared at 80 fathoms over a bottom depth of

305 to 130 fathoms due west of Willapa Harbor. Fair traces observed south of the Columbia River were centered between 60 and 55 fathoms. Sporadic traces occurred between 76 and 73 fathoms just north of Tillamook Head, Oreg., with fair to good traces occurring just SW. of Tillamook Head at 58 fathoms. Occasional patches of weak traces appeared between Tillamook Head and Cape Falcon, Oreg. South of Cape Falcon, traces were poor and continued poor to waters off the Siuslaw River, Oreg., where fair traces were observed from 80 to 75 fathoms. Fair traces reappeared 30 miles south of Cape Blanco, Oreg., in 110 to 134 fathoms. In general, echo traces and catches were better north of the Columbia River Lightship than south.

**FISH SIZE, MATURITY, AND STOMACH CONTENTS:** As in previous cruises, hake collected from Puget Sound were smaller than those collected off Washington and Oregon. Samples of male hake collected from Puget Sound, off Washington, and off Oregon ranged in length from 7-20.8 inches, 16.5-25.9 inches, and 14.6-23.2 inches, respectively; female hake collected from those three areas ranged in length from 7.5-23.6 inches, 16.5-25.2 inches, and 16.1-27.2 inches, respectively.

Ovaries examined were limited to various stages of early development. Testes showed a much wider range of development and fully developed multilobed testes with running milt were common.

Stomach contents of Pacific hake were examined from each catch. Stomachs were usually empty and occasionally Euphausiids were observed; pink shrimp or herring were noted rarely. Also, in cooperation with the Bureau's Seattle Technological Laboratory, 10,000 pounds of hake were delivered to a commercial fish company in Warrenton, Oreg., for fillet and fish-fillet block studies. Samples of hake were collected and frozen aboard the vessel for a comparative study of meat firmness relative to different geographic areas.

**Cruise 73:** The M/V John N. Cobb left Seattle, August 30, 1965, on a 5-week exploratory hake-fishing survey along the coast of California. The cruise was to be conducted in cooperation with the Bureau's Seattle and La Jolla Biological Laboratories, Seattle Technological Laboratory, and the California

Department of Fish and Game. The primary purpose was to determine the geographic and bathymetric distribution of schools of hake along the California coast during September. Secondary objectives were to (1) obtain biological data on Pacific hake, and (2) obtain additional data relative to the catching efficiency of the Mark II "Cobb" pelagic trawl.

Note: See Commercial Fisheries Review, September 1965 p. 40.



## North Pacific Fisheries Investigations

### MATURE SOCKEYE SALMON GROWTH AND MORTALITY RATES IN BRISTOL BAY STUDIED:

Over 6,700 sockeye salmon were tagged off the eastern Aleutians by the chartered vessel Yaquina during a cruise from May 21 to July 15, 1965. The vessel, together with the George B. Kelez and the Paragon, was engaged in a U. S. Bureau of Commercial Fisheries study of the growth and mortality rates of Bristol Bay salmon during their last 40 days of ocean life. Data on natural growth and mortality is needed in order to estimate the effect of the extensive Japanese high-seas salmon fishery on the potential yield of the Bristol Bay stocks.

To capture fish for tagging, the Yaquina used a knotless nylon purse seine 400 fathoms long and 30 fathoms deep. At the first fishing station (located south of Dutch Harbor in the North Pacific Ocean), a total of 3,966 sockeye were measured, tagged with Petersen discs, and released. In Bristol Bay, Petersen disc and spaghetti tags were attached to an additional 2,757 sockeye salmon. The major tagging station in Bristol Bay was located northeast of Port Moller where shallow water required modification of the purse seine so it would fish only to 20 fathoms.

Many more sockeye were captured than could be tagged. In 36 sets, over 14,000 fish were taken. The consistently good catches at sea helped forecast the large run to Bristol Bay in 1965.

Note: See Commercial Fisheries Review, July 1965 p. 38.

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### SALMON DROPOUT FROM GILL NETS STUDIED:

M/V "George B. Kelez" and "Paragon" (June-July 1965): To study the dropout of

salmon from gill nets (loss of salmon from high-seas gill nets) was the purpose of this 6-week cruise conducted jointly by the U. S. Bureau of Commercial Fisheries research vessels George B. Kelez and Paragon. The loss of dead or injured salmon from gill nets has long been considered a serious but undetermined source of salmon mortality.

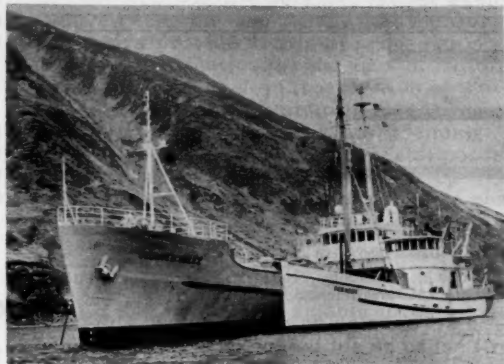


Fig. 1 - M/V George B. Kelez and M/V Paragon in Udagak Bay, Unalaska Island.

Both vessels completed the cruise in mid-July 1965, after fishing broad areas of the North Pacific Ocean south of Unalaska Island, the Bering Sea north of Port Moller, and the near approaches to Bristol Bay. The Paragon devoted its efforts exclusively to the study of dropouts, while the George B. Kelez divided its time between the dropout study and the comparison of returns of tagged gill net- and long line-caught salmon and tag returns from oxygen-treated and untreated salmon.

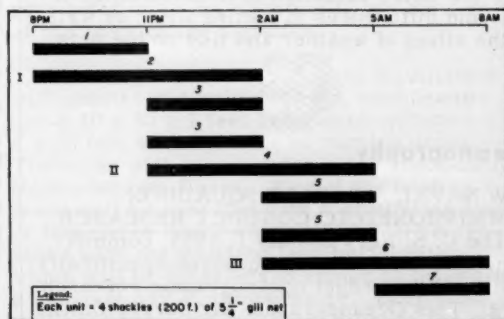


Fig. 2 - Night dropout fishing plan (each unit of gear is identical; length of shaded area refers to fishing time).

Two fishing techniques were used to determine dropout rates. The night fishing plan consisted of fishing units (4 shackles per unit)



of 5½-inch mesh gill net over 3 different time periods during the night (fig. 2). The catch of a 6-hour unit when compared with the catches of similar units fished during the first 3-hour portion and the second 3-hour portion of the same period provides an estimate of the dropout rate. A total of 5,134 salmon was taken by 28 night dropout sets made by the two vessels.

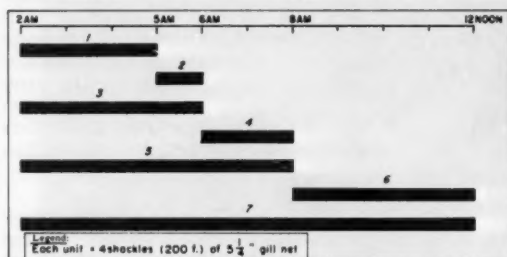


Fig. 3 - Day dropout fishing plan (each unit of gear is identical; length of shaded area refers to fishing time).

The second fishing plan required 4 units of gill net to be set before daylight and fished for varying periods until noon. Additional units were set and fished concurrently for shorter periods (fig. 3). The day dropout sets caught 1,019 salmon.

In each of the two fishing plans the rate of dropout is determined by the discrepancy between the catch of the unit fished continuously and the sum of the catches of the units fished shorter portions of the same period. Analysis of the data, at the Bureau's Biological Laboratory, Seattle, Wash., will take into consideration several variables encountered including sea lion and shark activity along the nets, variation in the abundance of fish, and differences in fishing time, as well as the effect of weather and tide on the nets.



## Oceanography

### NEW NAVAL AIRCRAFT SQUADRON COMMISSIONED TO CONDUCT RESEARCH:

The U. S. Navy on July 1, 1965, commissioned its first aircraft squadron specifically organized to conduct oceanographic research work. This Oceanographic Air Survey Unit, consisting of four C-121 super constellations and one C-54 skymaster, will be based at the U. S. Naval Air Station, Patuxent River, Md. It will be under the technical control of the Commander, U. S. Naval Oceanographic Office.

The use of aircraft in oceanography is not new. In 1953, the Oceanographic Office began using aircraft for its Project Magnet. Those planes have since logged over one-half million survey miles in support of a worldwide magnetic charting program.

Also, a super constellation has been used since 1963 to collect surface temperatures and wave profiles for the Oceanographic Office Antisubmarine Warfare Environmental Prediction System (ASWEPS).

For the third project, known as "Birdseye," planes have been used for about four years in an intensive ice research effort in the Central Arctic Basin. (Newsletter, National Oceanographic Data Center, June/July 1965.)



## Oregon

### SHRIMP FISHERY TRENDS, SUMMER 1965:

The 1965 Oregon shrimp season opened on March 1 and will close on October 31. Shrimp landings in Oregon during the summer of 1965 were running below those in the same period in 1964, probably due to the high percentage of small shrimp in the catch. The appearance of many small shrimp of the 1964 year-class in the 1965 landings may be an indication of good future harvests.

Effective August 2, 1965, the Oregon Fish Commission closed Oregon ports to landings of pink shrimp caught off the northern California coast. The closure was ordered to support the California Fish and Game Department's decision to prevent additional landings of shrimp from a large shrimp bed located just south of the California-Oregon border. The 1965 harvest quota of 1 million pounds of shrimp for that particular bed was fulfilled in late July 1965. The closure did not affect fishing on shrimp beds off the Oregon coast nor landings of Oregon shrimp in Oregon ports. (Oregon Fish Commission, July 29, 1965.)

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### CONSTRUCTION OF NEW WILLAMETTE FALLS FISHWAY TEMPORARILY DELAYED:

Bids received in the summer of 1965 for construction of the first phase of the Willamette Falls fishway were in excess of avail-



able funds and engineering estimates and were rejected by the Oregon Fish Commission. Because of the insufficient time remaining before winter high water at the site, it was decided to postpone any readvertising for bids until early in 1966. In the meantime all planning and construction details will be carefully studied and evaluated in the hope that acceptable bids will be obtained at the later date.

Despite the delay caused by rejection of the bids, engineers of the Oregon Fish Commission feel the ultimate completion date of the entire fishway at Willamette Falls need not necessarily be postponed beyond the original target of 1967.

The new fishway is to be the very latest in modern design in contrast to its predecessor which was first built in 1904 and which, though rebuilt and supplemented over the years, all but failed to pass fall chinook and coho salmon during the low water flows in the Willamette River. With the new fishway, it is believed the potential annual escapement of spring and fall chinook and coho salmon and steelhead in the Willamette could reach 285,000 fish, a dramatic increase over present escapement. The greatest potential increase will be in fall chinook and coho salmon. Millions of fingerlings of those species have already been liberated in the upper Willamette in contemplation of their using the new passage facility on their return as adults. (Oregon Fish Commission, July 27, 1965.)

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#### EXPERIMENTAL LIVE FISH-HOLDING FACILITY FOR LOWER DESCHUTES RIVER:

Construction of an experimental adult fall chinook holding facility near the mouth of the Deschutes River was under way in midsummer 1965, according to the Oregon Fish Commission. The purpose of the installation is to determine the suitability of Deschutes River water for holding adult fall chinook until they mature sufficiently to provide eggs for fish cultural purposes. The facility was expected to be in operation by August 12, 1965, to assure accommodation of the 1965 fall chinook run. Urgency of the project was based on the expected completion of the John Day Dam in 1968 with subsequent flooding out of main stem spawning areas used by as many as 60,000 fall chinook each season.

The results of this initial operation on the Deschutes will be used to guide future planning for handling fish in the area. The fisheries agencies cooperating in the project, which will be operated by the Oregon Fish Commission, include the Washington Department of Fisheries, Washington Department of Game, Oregon Game Commission, and the U. S. Fish and Wildlife Service. Those agencies have recommended jointly that the Corps of Engineers provide artificial propagation facilities as mitigation for the loss of the fall chinook spawning area in that portion of the main stem Columbia River to be flooded by the John Day Dam. The Corps is financing the study. A site for the experimental ponds on the east bank of the Deschutes just upstream from the U. S. Highway 30 bridge was provided by the Oregon Parks and Recreation Division of the State Highway Department.

The Director of the Oregon Fish Commission said that before any sizable investment is made in a production facility it is essential that the feasibility of holding adult fall chinook in Deschutes River water be thoroughly investigated. During recent years water temperatures as high as 69° F. have been recorded from the lower Deschutes during late summer. Optimum temperature for holding fall chinook is considered to be about 55° F., but falls have been successfully held at considerably higher temperatures. It was pointed out that with a substantial number of fall chinook flooded out of their usual spawning areas, it becomes necessary to handle the fish in the best manner possible to keep from losing that segment of the run. Artificial propagation appears to offer the best solution to the situation in the opinion of the cooperating agencies.

The temporary experimental installation will consist of 4 holding tanks, each measuring 10 x 30 x 7 feet deep, each with two 4 x 10 feet sorting tanks of varying depth. The tanks will have wooden sides and 2-inch thick concrete floors. Two of the holding tanks will be operated with a continuous flow of Deschutes River water and 2 will be provided with recirculated Deschutes water which will be filtered and cooled to maintain a constant 55° F. temperature. Each pond will hold 100 adult fall chinook taken for the purpose from the fishway at The Dalles Dam.

When the eggs ripen in the fall they will be stripped from the fish at the facility and shipped for incubation and eventual rearing

to the Oregon Fish Commission's experimental Pelton hatchery. Some will also go to the U. S. Fish and Wildlife Service's hatchery on Abernathy Creek, Wash., where they will be hatched and the fingerlings reared to liberation size.

The problem is a critical one, the Commission director stated. All of the State and Federal fish and game agencies in the area are dedicated to finding a workable solution to the problem of perpetuating this important segment of the fall chinook population. (Oregon Fish Commission, Portland, August 2, 1965.)



## Oysters

### MARYLAND OBSERVATIONS FOR 1965:

An August 12, 1965, bulletin issued by the Chesapeake Biological Laboratory (Solomons, Md.) of the University of Maryland Natural Resources Institute, gives the following report of oyster growth and related data for the Maryland portion of the Chesapeake Bay:

**The 1965 Spatfall:** The monitoring of spatfall continued in 1965 the same as in 1964 using transite plates as sample cultch. The program was expanded somewhat to include extra stations in the Potomac River, Tangier Sound, and the Severn River.

The setting began earlier than usual in 1965. In the upper St. Marys River, spat were recorded as early as June 8, whereas a year earlier in the same location no spat were found until June 25. Another interesting phenomenon which occurred in some of the higher setting areas was a bimodal setting pattern in which a strong wave of setting during the week of June 8-15 was followed by a slump and then two weeks later setting resumed heavier than ever. The Choptank River area and the upper St. Marys River both show that pattern.

The spat seemed to be setting well in the major seed areas--Tar Bay, Eastern Bay, and the St. Marys. However, very little setting was observed in the Potomac River, and Holland Straits was also failing to show any substantial spatfall again.

The U. S. Bureau of Commercial Fisheries Laboratory at Oxford, Md., again record-

ed spatfall in the Tred Avon River, Harris Creek, and Irish Creek.

**Summary of 1964 Spatfall:** The last spatfall recorded by the Chesapeake Biological Laboratory occurred during the week of September 23, 1964, in the Manokin River. There was no substantial setting monitored after the first week in September, and most of the peaks appeared to occur in late July and early August.

**Survey:** The yearly fall oyster bar survey by the Department of Chesapeake Bay Affairs with the cooperation and assistance of the Chesapeake Biological Laboratory began in October 1964 and continued through the end of the year into January 1965. A total of 730 samples of bottom material were taken, each sample consisting of  $\frac{1}{2}$  Maryland oyster bushel. The majority of the samples were obtained from seed or shell plants but some natural rocks were also examined. It was assumed that most of the spat in the areas surveyed had attained enough size to be clearly visible (in one month a spat can grow large enough to be easily seen) but some of the late setting spat were probably missed, since growth slows down and finally stops as the water temperature approaches 41° F. Spat which set too late in the season to grow appreciably before they are forced to stop feeding by the onset of low temperatures are often mistaken for "winter set" when they are discovered the following spring on boat hulls, etc.

The previous year the seasonal spatfall accumulations as determined by the survey were averaged by areas and listed on a diagram of the Maryland oyster-producing area. Since that method of summarizing the survey insofar as it dealt with seasonal spatfall seemed fairly effective it was repeated this year, and the two diagrams make an interesting comparison. The year 1964 was a good setting year in many areas and even seemed to equal or exceed 1963 in such places as Eastern Bay, Tar Bay, and Hooper Straits. Some areas such as the Wicomico on the Potomac and the South River reverted back to their typical low counts after an exceptionally good set in 1963.

Notes: (1) For more detailed data write to the Chesapeake Biological Laboratory, Natural Resources Institute, University of Maryland, Solomons, Md. ("Report of Maryland Oyster Observations for 1965," Ref. No. 65-60, August 12, 1965.)

(2) See Commercial Fisheries Review, October 1964 p. 34.



## Salmon

### BRANDING TECHNIQUE TESTED ON ALASKA SOCKEYE SALMON:

To aid migration studies, some Alaskan salmon are now being branded like cows. Serial numbers are burned on the fish with a rod heated in water. The new technique was used on young sockeye salmon in Alaska for the first time in the summer of 1965. Initial field tests were made at the Brooks Lake Biological Field Station of the U. S. Bureau of Commercial Fisheries. The brand consisting of numbers and letters is made with a metal rod (silver tip on copper) heated in boiling water and applied for approximately one second much like the hot iron used in branding cattle. The brand remains legible on the fish up to 18 months.

The salmon branding technique was developed under the Fish-Passage Research Program of the U. S. Bureau of Commercial Fisheries and has been used in various studies in the Columbia and Snake Rivers.

Finding a suitable tag or mark to identify fish in research has been a challenging problem for fishery biologists. Various types of tags and fin-clip marks have been used. But scientists have expressed concern that adding tags or clipping fins may interfere with swimming movements of fish. The new branding technique does not add any weight to the fish, nor does it remove any fins. The initial success with branding opens possibilities for future and even more extensive use.

Note: See Commercial Fisheries Review, March 1963 p. 60.

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### POLLUTION THREAT REDUCED IN WILLAMETTE RIVER:

Emergency water releases from power dams plus reduced waste disposal by mills may have saved the fall run of chinook salmon in Oregon's Willamette River—but the pollution danger is far from ended. That was the situation on the Willamette in late August 1965, according to the Director of the Columbia River Program Office of the U. S. Bureau of Commercial Fisheries. He said fall chinook salmon were passing over Willamette Falls at Oregon City in good numbers, indicating "that the reduction in pollution resulting from recent emergency measures has increased the oxygen in the Willamette enough to sustain fish life."

As of August 27, 1965, the daily low oxygen reading had risen to 6 parts per million at Oregon City and 3 parts per million in Portland Harbor, as compared to readings of 3.7 and 1.6, respectively, when the pollution crisis was at its height earlier in August. Such low readings, if continued over an extended period, could have destroyed all the fish in the river.

"The improvement is due to the willingness of the Army Engineers in cooperation with Bonneville Power Administration (BPA) to release water from the electric power storage supply prematurely and also to the mills' reducing their effluent output," the Director of the Columbia River Program said. "We are grateful to BPA, the Engineers, and the mills for their efforts."

But he cautioned that the danger to the fish runs in the polluted Willamette has not been eliminated, even temporarily, and "there is no ground for any relaxation in our attempts to keep the river clean and safe." He pointed out that September is traditionally a month of high pollution in the Willamette and any slackening of pollution control would be very dangerous.

"We are still striving to reach a minimum level of 5 parts per million in Portland Harbor to assure safe passage of the fish there," he said.

The Secretary of the Interior has warned that the releases of clean water stored for power and other purposes must not be counted upon as a substitute for adequate pollution control.



## Shrimp

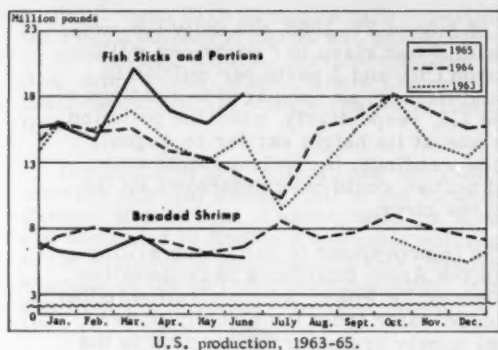
### BREADED PRODUCTION, APRIL-JUNE 1965:

United States production of breaded shrimp during the second quarter of 1965 amounted

Table 1 - U. S. Production of Breaded Shrimp by Areas, April-June 1965

Area	1/Apr.-June 1965		Apr.-June 1964	
	Plants	Quantity	Plants	Quantity
	No.	1,000 Lbs.	No.	1,000 Lbs.
Atlantic . . . .	14	5,938	14	6,335
Gulf . . . . .	16	10,167	21	11,574
Pacific . . . .	7	1,893	8	1,877
Total . . . .	37	17,998	43	19,786

1/Preliminary.



to about 18.0 million pounds--a decrease of about 1.8 million pounds or 9.0 percent as compared with the same period in 1964.

Table 2-U. S. Production of Breaded Shrimp by Months, 1964-65

Month	1/1965	1964
	.. (1,000 Lbs.) ..	
January .....	6,901	7,347
February .....	6,613	8,045
March .....	7,742	7,249
April .....	6,120	7,027
May .....	6,023	6,171
June .....	5,855	6,588
July .....	-	8,641
August .....	-	7,299
September .....	-	7,830
October .....	-	9,169
November .....	-	7,852
December .....	-	7,460
Total .....	-	90,678
1/ Preliminary.		

The Gulf States ranked first in the production of breaded shrimp with 10.2 million pounds, followed by the Atlantic States with 5.9 million pounds, and the Pacific States with 1.9 million pounds.



## South Atlantic Fisheries

### Explorations and Gear Development

#### LONG-LINING FOR SWORDFISH IN BAHAMA AREA TESTED:

M/V "Oregon" Cruise 102 (July 14-30, 1965): Preliminary investigations to assess the availability of swordfish (*Xiphias gladius*) were continued during this 18-day exploratory long-line fishing cruise by the U. S. Bureau of Commercial Fisheries research vessel Oregon. The cruise covered the surround-

ing areas of Grand Bahama, Abaco, and Eleuthera Islands in the Bahamas and along the Continental Shelf off the Florida coast.

A total of 9 long-line sets (4,300 hooks) in the area covered yielded 17 swordfish. Four sets (2,000 hook total) east of Great Abaco Island and Eleuthera Island where surface water temperatures registered 83° F. yielded 3 swordfish. One 300-hook set in Northeast Providence Channel accounted for one swordfish.

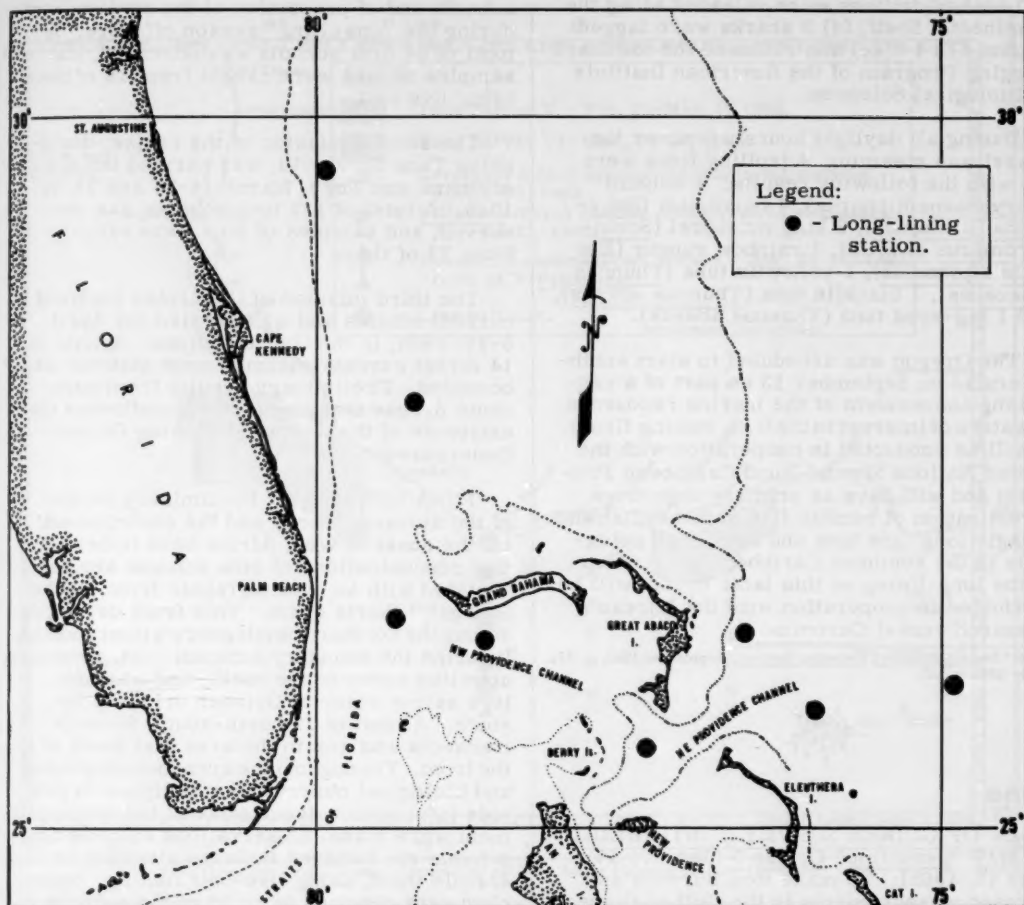
A 500-hook set in Northwest Providence Channel yielded 3 small swordfish weighing 35, 27, and 52 pounds, respectively. Surface water temperature in that area also registered 83° F. Another 500-hook set along the eastern edge of the Straits of Florida east of Palm Beach brought negative results. Forty-two miles north of Matanilla Shoal along the Continental Shelf a 500-hook set yielded 2 swordfish. The heaviest concentration of sharks (22 captures) during the entire cruise was encountered in that area.

The most promising fishing area of the cruise was 70 miles east of St. Augustine between 271 and 351 fathoms in surface water of 84° F. A 500-hook set with 10- and 20-fathom buoy-line drops and baited with frozen squid and Spanish mackerel ( $\frac{3}{4}$  to 1 pound) yielded 6 swordfish (round weight 559 pounds).

Incidental catches of blue marlin (*Makaira nigricans*), sailfish (*Istiophorus* sp.), yellowfin tuna (*Thunnus albacares*), big-eyed tuna (*Thunnus obesus*), blackfin tuna (*Thunnus atlanticus*), barracuda (*Sphyræna* sp.), and dolphin (*Coryphaena* sp.) were made throughout the cruise. Shark damage was negligible.

The exploratory long-line swordfish fishery technique followed a pattern of setting 500 hooks shortly after sunset and allowing the gear to soak throughout the night for about 10 hours. Retrieval of the line commenced at daybreak and continued on an average of 3-4 minutes a basket depending on the amount of fish on the line. The gear is a standard basket of 10 hooks, spaced 12 fathoms apart with 3-fathom gangions and an additional 1-fathom stainless steel leader. Buoy drops varied in length from 10 to 30 fathoms. A breakdown of the drops is as follows: 1,860 hooks (43 percent) at 10 fathoms; 2,090 hooks (46 percent) at 20 fathoms; and 350 hooks (11 percent) at 30 fathoms.



Station pattern of M/V Oregon Cruise 102 (July 14-30, 1965).

Fresh-frozen baits were used exclusively throughout the cruise as follows: 3,470 hooks of mackerel ( $\frac{3}{4}$  to 1 pound size) and 830 hooks of squid.

Of the total 17 swordfish caught, 76 percent (13 fish) were taken on the 20-fathom drops. A breakdown of the catch by dropbait is as follows: Ten-fathom squid (800 hooks) 1 fish; mackerel (1,060 hooks) 2 fish. Twenty-fathom squid (330 hooks) 2 fish; mackerel (1,760 hooks) 11 fish. Thirty-fathom mackerel (350 hooks) 1 fish.

Total weight of the swordfish caught was 1,401 pounds. This includes an estimated weight of 80 pounds for the one shark-dam-

aged fish of the entire cruise. Individual weights of the swordfish ranged from 18 to 162 pounds. Five of them weighed over 100 pounds each; another 5 weighed from 75 to 100 pounds; and the remaining 7 fish weighed under 75 pounds each. All swordfish were measured, sex was determined, and stomach contents were examined, with all data recorded for future study.

In addition to the exploratory long-lining, other activities during the cruise were: (1) 9 nekton and 5 dip-net stations were occupied for the collection of juvenile and larval species; (2) 15 bathythermograph (BT) casts were made; (3) in cooperation with the Woods Hole Oceanographic Institute, 120 drift bottles and

170 seabed drifters were released along the Continental Shelf; (4) 5 sharks were tagged (4 dart and 1 disc) and released for the Shark Tagging Program of the American Institute of Biological Sciences.

During all daylight hours whenever the vessel was steaming, 4 trolling lines were set with the following results: 4 dolphin (*Coryphaena hippurus*), 4 barracuda (*Sphyraena barracuda*), 2 king mackerel (*Scomberomorus cavalla*), 1 rainbow runner (*Elagatis bipinnulus*), 1 yellowfin tuna (*Thunnus albacares*), 1 blackfin tuna (*Thunnus obesus*), and 1 big-eyed tuna (*Thunnus abesus*).

The Oregon was scheduled to start another cruise on September 13 as part of a continuing assessment of the marine resources of waters of interest to the U. S. fishing fleets. It will be conducted in cooperation with the United Nations Special Fund Caribbean Program and will have as primary objectives investigation of benthic fish and shellfish and pelagic long-line tuna and swordfish potentials in the southern Caribbean. A portion of the long-lining on this later cruise will be conducted in cooperation with the Bureau's research vessel Geronimo.

Note: See Commercial Fisheries Review, September 1965 p. 43; July 1965 p. 47.



## Tuna

### GULF OF GUINEA SURVEY CONTINUED:

M/V "Geronimo" Cruise 5 (January 17-May 18, 1965): To make tuna surveys and current measurements in the Gulf of Guinea was the main purpose of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Geronimo. This was the fourth cruise of the Geronimo to West Africa to participate in cooperative international studies of the tropical Atlantic. The Geronimo's Chief Scientist on the cruise said the vessel's latest expedition was successful in accomplishing two main objectives: (1) further measurement of a heretofore unknown ocean current in the Gulf of Guinea, and (2) confirmation of hypotheses about the distribution of tuna schools off West Africa.

The first mission of the cruise designated Tuna Survey V, was carried out February 10-March 2, 1965, off the coast of Sierra Leone and Liberia to survey the distribution of tuna

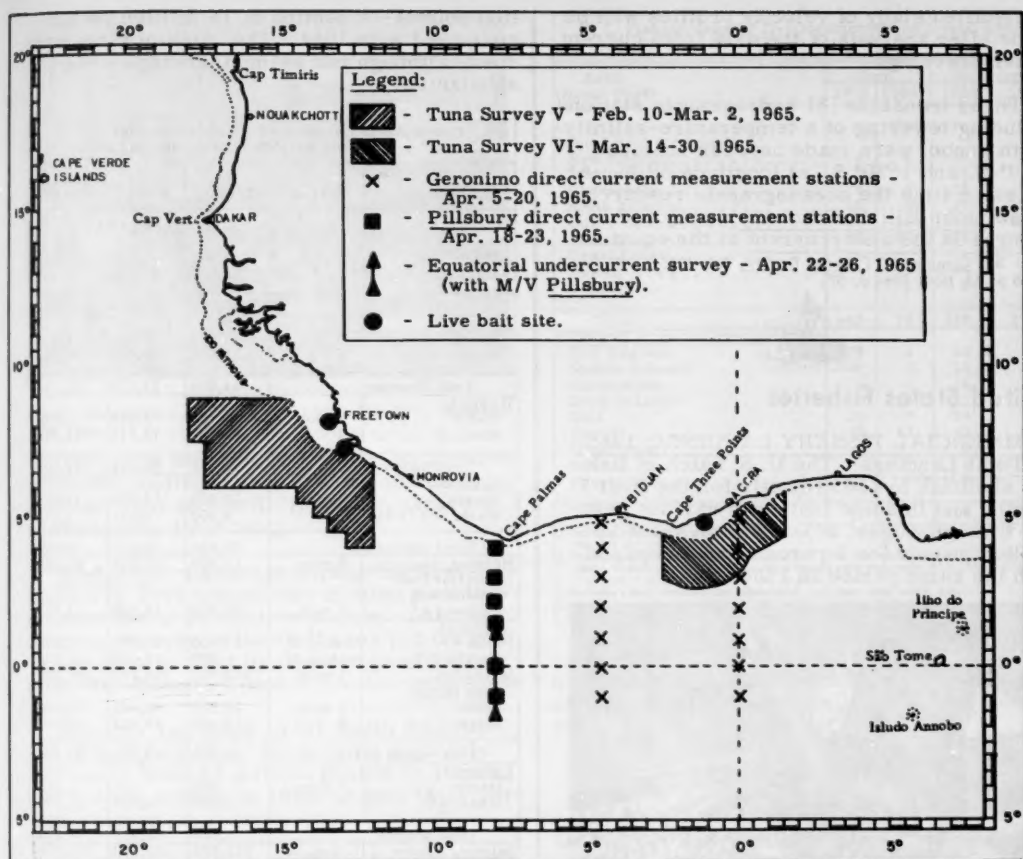
schools and of properties of the environment during the "upwelling" season offshore. A total of 84 tuna schools was observed, and samples of tuna were caught from 16 of them, using live bait.

The second mission of the cruise, designated Tuna Survey VI, was carried out south of Ghana and Togo, March 14-23 and 26-30, 1965. A total of 137 tuna schools was observed, and samples of tuna were caught from 23 of them.

The third mission of the cruise involved current studies and was carried out April 5-26, 1965, in the Gulf of Guinea. A total of 14 direct current-measurement stations was occupied. Preliminary results from parachute drogue tracking further confirmed the existence of the westward-flowing Guinea Undercurrent.

**TUNA SURVEY V:** Preliminary studies of the surface fishery and the environment off the coast of West Africa have indicated that concentrations of tuna schools are associated with an oceanographic front off the Senegal-Liberia coast. This front develops during the northern hemisphere winter months. It forms the boundary between cold, recently upwelled water to the north, and warmer, less saline water of Guinean origin to the south. A total of 22 north-south, 90-mile transects was run in the area just south of the front. Throughout the area, oceanographic and biological observations designed to provide information descriptive of the environment were made. Observations of the 84 tuna schools encountered included attempts to sample them, using live-bait fishing. Samples were obtained from 16 of the schools. By far the majority of the schools were skipjack of a small size, 5-7 pounds.

A dense concentration of large schools of skipjack was found on February 26, approximately 90 miles south of the location of the front. It would appear that the front itself does not act as a physical barrier to the migration of the tuna, but acts instead as a mechanism for producing increased food. The final maturation of concentrations of food, which may result in concentrations of tuna, could occur some distance from the front itself. In an attempt to obtain samples of the entire spectrum of food available to tuna, a high-speed Neuston net was towed through feeding tuna schools. Food samples also were taken from tuna stomachs.



M/V Geronimo Cruise 5 area of operations off West Africa (January 17-May 18, 1965).

**TUNA SURVEY VI:** A similar pattern of daily 90-mile transects was followed during Tuna Survey VI, carried out offshore from Ghana and Togo. During 15 transects, a total of 137 tuna schools was seen, and 23 samples of tuna were obtained. Virtually all of the schools encountered were made up of small yellowfin and skipjack, 5 to 7 pounds.

In general, those schools were most abundant in the western part of the survey area. Following the initial 10 transects, a repeat survey was made in the area where schools were most abundant. The distributional pattern of the repeat survey indicated that the area of greatest density of schools had moved westward.

**CURRENT METER PROGRAM:** At each of the 14 direct current measurement sta-

tions, a reference buoy was anchored to the bottom and a lowering of a Savonius rotor was made to determine the depth of a subsurface current velocity maximum. A surface drogue and a drogue at the depth of the velocity maximum were then released and tracked by radar. At each station, lowerings were made to a depth of 500 meters (1,640 feet) with a recording current meter. In addition, a Nansen cast, productivity station, meter net tow, and Clarke-Bumpus haul were made.

Drogue results indicated the westward-flowing south equatorial surface current in the vicinity of the Equator, the eastward Guinea surface current to the north, the eastward-flowing Atlantic Equatorial Undercurrent, and the westward-flowing Guinea Undercurrent below the Guinea surface current.

Detailed study of velocity profiles will be made after analysis of the data from current meter lowerings.

Three transects (31 hydrographic stations, including lowering of a temperature-salinity-depth probe) were made between latitude 1°30' N. and 1°30' S., at longitude 8° W. At the same time the oceanographic research vessel John Elliott Pillsbury monitored changes in the undercurrent at the equator.

Note: See *Commercial Fisheries Review*, July 1965 p. 40; Jan. 1965 p. 43; Nov. 1964 p. 57.



## United States Fisheries

### COMMERCIAL FISHERY LANDINGS, 1965:

Total Landings: The U. S. catch of fish and shellfish in 1965 (mostly for the first 7 months and in some instances various periods through August 27) was down about 18 million pounds (or 1 percent) as compared with the same period in 1964.



Fig. 1 - Brailing red salmon from gill net boat to buying scow in Bristol Bay, Alaska.

**Salmon:** On the basis of the reported pack of canned salmon, it was estimated that the Alaska catch to August 22 was about 273 mil-

lion pounds--a decline of 16 million pounds compared with 1964. The catch of pinks was down, although red salmon landings were up substantially.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1965 and 1964				
Species	Period	1/1965	1964	Total 1964
		..... (1,000 Lbs.) .....		
<b>Cod:</b>				
Maine .....	6 mos.	1,600	1,385	2,400
Mass. 2/ .....	7 "	16,500	17,134	29,504
Total cod .....		18,100	18,519	31,904
<b>Flounder:</b>				
Maine .....	6 mos.	900	666	1,152
Mass. ....	7 "	53,900	53,070	96,622
Total flounder .....		54,800	53,736	97,774
<b>Haddock:</b>				
Maine .....	6 mos.	700	1,348	2,948
Mass. 2/ .....	7 "	69,500	78,814	114,261
Total haddock .....		70,200	80,162	117,209
<b>Halibut 3/:</b>				
Alaska .....	7 mos.	16,600	12,689	17,064
Wash. and Oreg. ....	7 "	4,200	6,241	9,322
Total halibut .....		20,800	18,930	26,386
<b>Herring, Maine ..</b>	6 mos.	19,800	10,224	60,866
<b>Industrial fish (Maine and Mass.) 4/ .....</b>	7 mos.	42,600	18,540	32,391
<b>Mackerel:</b>				
Jack 5/ .....	to Aug. 27	33,100	46,268	89,618
Pacific 5/ .....	to Aug. 27	800	12,008	26,828
Menhaden .....	7 mos.	979,900	956,196	1,566,800
<b>Ocean perch:</b>				
Maine .....	7 mos.	33,800	30,762	58,936
Mass. ....	7 "	12,100	18,322	30,332
Total ocean perch .....		45,900	49,084	89,268
<b>Pollock:</b>				
Maine .....	7 mos.	300	630	1,312
Mass. 2/ .....	7 "	3,500	5,607	10,558
Total pollock .....		3,800	6,237	11,870
<b>Salmon, Alaska ..</b>	to Aug. 22	272,800	288,830	312,000
<b>Scallops, sea, New Bedford (meats) ..</b>	7 mos.	6,400	8,125	12,930
<b>Shrimp (heads-on):</b>				
So. Atl. ....	7 mos.	8,200	5,365	17,400
Gulf. ....	7 "	93,700	80,770	179,000
Tuna, Calif. ....	to Aug. 21	168,800	192,726	280,765
<b>Whiting:</b>				
Maine .....	6 mos.	3,200	4,888	25,304
Mass. ....	7 "	18,600	26,772	57,361
Total whiting .....		21,800	31,660	82,665
Total all above items ..		1,861,500	1,877,380	3,035,674
Other 6/ .....		333,700	336,001	1,487,326
Grand total .....		2,195,200	2,213,381	4,523,000

1/ Preliminary.  
2/ Landed weight.  
3/ Dressed weight.  
4/ Excludes menhaden.  
5/ Cannery receipts.  
6/ Includes landings for species not listed.  
Note: Finfish generally converted to round weight, crustaceans to weight in the shell, and mollusks reported in meats only.

**Tuna:** Landings in California to August 21 totaled about 169 million pounds--down 24 million pounds compared with the same date





Fig. 2 - Unloading a small dragger at State Fish Pier, Gloucester, Mass.

in 1964. The principal decrease occurred in yellowfin landings, but albacore and bluefin landings also declined. However, albacore production is improving.

**Menhaden:** Landings during the first 7 months of 1965 totaled 980 million pounds--an increase of 24 million pounds. Landings were up sharply in the Gulf area but the gain was partially offset by reduced production along the Atlantic Coast.

**Shrimp:** Landings in the South Atlantic and Gulf States from January through July increased from 86 million pounds in 1964 to 102 million pounds in 1965--a gain of 18 percent.

**Mackerel:** Landings of Pacific mackerel (800,000 pounds) and jack mackerel (33 million pounds) to August 27 were down 11 million pounds and 13 million pounds, respectively, compared with the same period in 1964.

**Industrial fish:** Landings for the first 7 months of 1965 in Maine and Massachusetts of species used chiefly in the manufacture of fish meal and oil totaled 43 million pounds--a gain of 24 million pounds or 130 percent.



## U. S. Fishing Vessels

### DOCUMENTS ISSUED AND CANCELLED, JUNE 1965:

During June 1965 a total of 88 vessels of 5 net tons and over was issued first docu-

U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, June 1965 with Comparisons				
Area (Home Port)	June		Jan.-June	
	1965	1964	1965	1964
. . . . .(Number). . . . .				
<b>Issued first documents 2/:</b>				
New England.....	4	6	17	19
Middle Atlantic.....	2	-	7	5
Chesapeake.....	4	5	18	23
South Atlantic.....	10	4	37	25
Gulf.....	31	28	144	120
Pacific.....	37	27	113	80
Great Lakes.....	-	-	1	1
Hawaii.....	-	1	-	1
Puerto Rico.....	-	1	1	1
Total.....	88	72	338	275
<b>Removed from documentation 3/:</b>				
New England.....	5	3	23	17
Middle Atlantic.....	-	3	11	12
Chesapeake.....	4	1	18	17
South Atlantic.....	2	4	43	24
Gulf.....	14	7	54	54
Pacific.....	10	13	47	82
Great Lakes.....	1	-	9	9
Hawaii.....	-	-	2	-
Puerto Rico.....	1	-	1	-
Total.....	37	31	208	215
1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.				
2/There were 10 undocumented vessels in June 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 63 in 1965; 3 in 1964; 1 in 1962; 2 in 1957; 1 in 1954; and 18 prior to 1949.				
3/Includes vessels reported lost, abandoned, forfeited, sold, alien, etc.				
Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.				

ments as fishing craft as compared with 72 in June 1964. There were 37 documents cancelled for fishing vessels in June 1965 as compared with 31 in June 1964.



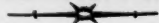
## U. S. Foreign Trade

### IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-August 1, 1965, amounted to 24,618,503 pounds (about 1,172,310 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 13.3 percent from the 21,726,482 pounds (about 1,034,600 standard cases) imported during January 1-August 1, 1964.



The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty is limited to 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.



## Virginia

### FISHERY LANDINGS, 1964:

Commercial fishery landings in Virginia in 1964 totaled 465.7 million pounds with an ex-vessel value of \$24.2 million as compared with 1963 landings of 374.7 million pounds worth \$19.1 million. Heavier landings of menhaden accounted for most of the increase in quantity, while a better harvest of oysters and blue crab contributed to the increase in value. Menhaden, blue crab, and oysters, together with alewives and scup, accounted for 93 percent of the 1964 landings.

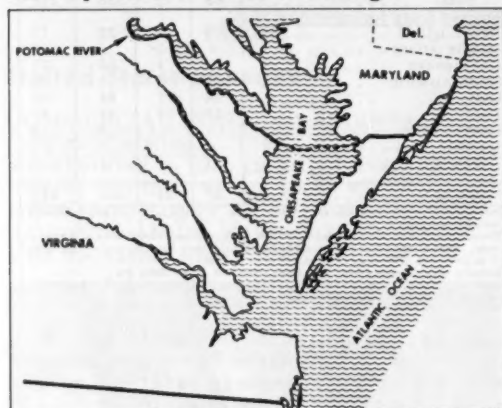


Fig. 1 - Virginia fishing areas.

Virginia's menhaden landings in 1964 totaled 330.2 million pounds with an ex-vessel value of \$4.7 million as compared to 255.7 million pounds in 1963 with an ex-vessel value of \$3.3 million.

Blue crab landings in 1964 were 52.5 million pounds with an ex-vessel value of \$4.1 million--up 11 percent in quantity and 38 percent in value from 1963. The 1964 harvest of market oysters totaled 14.2 million pounds with an ex-vessel value of \$10.3 million--up 34 percent in quantity and 27 percent in value from 1963. Hard clam landings in 1964 totaled 2.4 million pounds with an ex-vessel value of \$1.2 million, compared to 2.1 million pounds worth \$1.0 million in 1963.

The leading food finfish items landed in 1964 were alewives 26.6 million pounds, scup 10.9 million pounds, swellfish 4.3 million pounds, sea bass 3.8 million pounds, spot 3.2 million pounds, and shad 2.6 million pounds. Other finfish landings topping the million-pound mark were flounder (mostly

fluke), butterfish, striped bass, catfish, sea trout, and shark or steakfish.



Fig. 2 - Fishing craft docked at Hampton, Va. On the left are 2 oyster dredgers; in the center, 2 draggers; and on the extreme right, 2 crab boats.

Swordfish landings in 1964 increased to 635,400 pounds worth \$207,900 ex-vessel. Nevertheless, expectations that Virginia ports would become swordfish centers were not realized. The great majority of the swordfish catches on southern grounds were landed elsewhere. Virginia vessels did not participate in the swordfish fishery in 1964.

The leading fishing area in Virginia in 1964 was Chesapeake Bay with landings of 322.2 million pounds, followed by the Atlantic area with 76.3 million pounds, Chesapeake Bay tributaries with 41.4 million pounds, and the Potomac River with 25.8 million pounds. Landings by area in 1963 were Chesapeake Bay 268.6 million pounds, Atlantic Ocean 54.5 million pounds, Chesapeake Bay tributaries 30.4 million pounds, and Potomac River 20.7 million pounds.



## Washington

### FISH FARMING PROGRAM FOR SALMON EVALUATED:

The fish farm program in the State of Washington will be upgraded and consolidated during the next 2 years by the elimination of a number of the poorer areas, according to the State Fisheries Director.

The decision was prompted by an economic evaluation completed in 1965 of the success of rearing coho (silver) salmon in fish farms. The study estimated that in the overall there has been only 14 cents benefit in salmon production for each tax dollar spent. The study is the culmination of intensive sampling and evaluation over the past two years.

Fish farming of salmon would continue to be a useful tool in fish propagation, but at this stage of development can not assume the major role, the Fisheries Director said. Efforts will be continued to reduce costs and increase production in salmon rearing to assure the greatest catch possible for the money spent, he added. (Department of Fisheries, Olympia, August 18, 1965.)

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#### NEW FEE SCHEDULE FOR COMMERCIAL FISHING LICENSES:

Washington State commercial fishermen will not be required to have a personal fishing license after August 6, 1965, announced the Director of the Washington State Department of Fisheries on July 28, 1965.

A new fee schedule for commercial fishing licenses became effective on August 6--90 days after passage by the 1965 Legislature of the new schedule. The new gear license fees were increased to include personal licenses for all crew members, so after that date it will not be necessary for each commercial fisherman to have an individual fishing license.

In 1965, all commercial salmon fishing gear licenses had to be obtained by February 1; in 1966 the deadline will be April 1. It was emphasized that these licenses are for commercial fishing only. In Washington State there is no license required for any personal use (sport) fishing for food fish, although salmon fishermen must have a salmon punch card, which is free and nonlimiting. (Department of Fisheries, Olympia, July 28, 1965.)

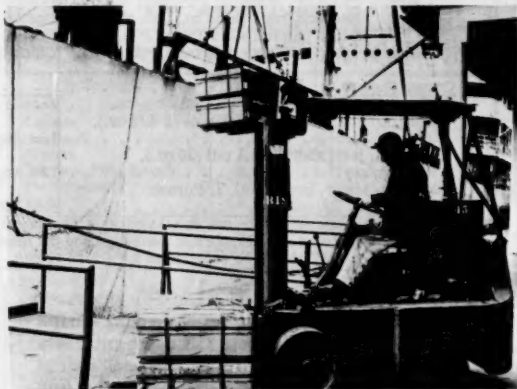


#### Wholesale Prices

##### EDIBLE FISH AND SHELLFISH, AUGUST 1965:

Prices for fresh and frozen fish in August 1965 were higher than the normal seasonal summer pattern. At 114.3 percent of the 1957-59 average, the wholesale index for edible fishery products (fresh, frozen, and canned) rose 4.1 percent from the previous month. Compared with August 1964, the overall index this August was up 8.4 percent. August 1965 prices generally ranged from higher to sharply higher than in the same month a year earlier.

Prices for all items in the subgroup for drawn, dressed, or whole finfish rose from July to August, with the index up 12.1 percent. There was a steep price increase at Boston for ex-vessel large haddock (up 61.6 percent) because of very light landings. At New York City, prices were up 12.0 percent for Great Lakes round yellow pike, 1.4 percent for western fresh salmon, and 1.0 percent for western fresh halibut. Chicago prices for Lake Superior fresh whitefish were up 8.6 percent from the previous month. As compared with August 1964, the subgroup index this August was up 16.4 percent. Except for salmon, all other prices in the subgroup were sharply higher than a year earlier--up 77.3 percent for ex-vessel haddock, 29.6 percent for yellow pike, 21.8 percent for halibut, and 21.1 percent for whitefish.



Loading foreign ship with steel-strapped overseas-packaged canned salmon at Port of Seattle Salmon Terminals.

The August 1965 fresh processed fish and shellfish subgroup was up slightly (0.2 percent) from the previous month solely because of the 2.5 percent price increase at Boston for fresh haddock fillets. Compared with the same month a year earlier, most prices this August were substantially higher and the index was up by 7.6 percent. Prices were up 15.5 percent for fresh haddock fillets and 12.5 percent for South Atlantic fresh shrimp at New York City. Prices at Norfolk for standard shucked oysters, while unchanged June-August 1965, were up 1.9 percent from August 1964.

The subgroup index for frozen processed fish and shellfish dropped 0.9 percent from July to August. Higher prices for frozen flounder and haddock fillets were more than

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, August 1965 with Comparisons								
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			August 1965	July 1965	August 1965	July 1965	June 1965	August 1964
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					114.3	109.8	108.9	105.4
<u>Fresh &amp; Frozen Fishery Products:</u>					117.4	112.8	111.5	106.9
<u>Drawn, Dressed, or Whole Finfish:</u>					133.4	119.0	113.3	114.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.19	.12	147.7	91.4	88.2	83.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.51	.50	149.4	147.9	129.4	122.7
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.31	.30	127.5	125.3	121.4	129.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.64	.59	94.8	87.3	91.3	78.3
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.70	.63	114.6	102.3	90.1	88.4
<u>Processed, Fresh (Fish &amp; Shellfish):</u>					108.8	108.6	109.6	101.1
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.41	.40	99.6	97.2	86.2	86.2
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.86	.86	100.8	100.8	104.3	89.6
Oysters, shucked, standards	Norfolk	gal.	7.13	7.13	120.2	120.2	120.2	118.0
<u>Processed, Frozen (Fish &amp; Shellfish):</u>					104.8	105.7	106.6	100.0
Fillets; Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	98.8	97.6	98.8	95.0
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.38	.37	111.4	108.5	108.5	108.5
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.31	.32	108.7	112.2	105.2	106.9
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.85	.88	100.8	103.7	105.5	94.9
<u>Canned Fishery Products:</u>					109.4	104.9	104.9	103.1
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.50	22.00	106.3	95.9	95.9	97.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.56	11.56	102.6	102.6	102.6	102.6
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	131.5	119.4
1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.								

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

offset by lower prices at Boston for ocean perch fillets (down 3.1 percent) and at Chicago for frozen shrimp (down 2.8 percent). But prices this August were higher for all items than in the same month of 1964, with the subgroup index up 4.8 percent.

The one and only change in August 1965 prices for canned fishery products was in canned pink salmon--up 11.4 percent from the previous month. The subgroup index was up 4.3 percent from the previous month. The stronger market for canned salmon was due to marked improvement in movement of the previous season's stocks and also because of

the failure of the 1965 pink salmon run. Toward the end of August 1965 the new pack of pink salmon was less than half that packed at the same time a year earlier. Prices for canned Maine sardines were unchanged from July to August--the new season pack picked up substantially by the end of August when it was about double that for the same period in 1964. Canned fish prices this August were higher than in the same month a year earlier and the index was up 6.1 percent. Prices were up 10.1 percent for pink salmon, 14.2 percent for California jack mackerel, and 10.1 percent for Maine sardines. There was no change in canned tuna prices.







# FOREIGN

## International

### FISH MEAL

#### PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-MAY 1965:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, Jan.-May 1965

Country	May		Jan.-May	
	1965	1964	1965	1964
.....(1,000 Metric Tons).....				
Chile .....	5.7	9.2	46.4	62.2
Angola .....	1.6	8.0	21.3	23.9
Iceland .....	10.6	7.2	42.7	47.7
Norway .....	13.6	17.5	73.6	95.4
Peru .....	157.9	133.0	785.8	664.0
So. Africa (including S.-W. Africa) ...	23.7	27.5	90.1	90.2
Total .....	213.1	202.4	1,059.9	983.4

Table 2 - Production of Fish Meal by Member Countries of the FEO, Jan.-May 1965

Country	May		Jan.-May	
	1965	1964	1965	1964
.....(1,000 Metric Tons).....				
Chile .....	3.8	14.5	41.4	75.2
Angola .....	1.7	7.1	17.2	24.7
Iceland .....	7.1	4.5	34.3	35.6
Norway .....	27.8	11.2	107.0	86.0
Peru .....	127.9	123.4	786.1	777.7
So. Africa (including S.-W. Africa) ...	37.3	33.4	149.2	130.0
Total .....	205.6	194.1	1,135.2	1,129.2

Peru accounted for about 74 percent of the 1,059,900 metric tons of fish meal exported by FEO countries in January-May 1965.

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#### WORLD PRODUCTION, MAY 1965:

World fish meal production in May 1965 showed only a small increase over the previous month. A decline in Peruvian output almost offset higher production in the United States, Canada, Denmark, Iceland, Norway, and South Africa.

World Fish Meal Production by Countries, May 1965 with Comparisons

Country	May		Jan.-May	
	1965	1964	1965	1964
.....(Metric Tons).....				
Canada	5,594	3,941	29,487	16,401
Denmark	11,636	8,466	42,359	30,074
France	1,100	1,100	5,500	5,500
German Fed. Repub.	4,823	5,279	26,850	31,550
Netherlands	704	400	2,408	2,900
Spain	3,208	1/	13,247	1/
Sweden	528	531	3,969	5,428
United Kingdom	6,067	5,467	34,639	33,812
United States	21,003	29,066	2/38,201	2/43,262
Angola	1,671	7,114	17,242	24,747
Iceland	7,092	4,547	34,324	35,669
Norway	27,799	11,228	107,008	86,048
Peru	127,885	123,336	786,115	777,778
So. Afr. (including S.-W. Afr.)	38,616	33,297	150,798	130,277
Belgium	375	375	1,875	1,875
Chile	3,865	14,501	41,367	75,253
Morocco	500	2,150	1,100	4,060
Total	262,488	250,798	1,336,490	1,302,634

1/ Data not available.

2/ Revised.

Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

World fish meal production in January-May 1965 was about the same as that in the first 5 months of 1964. Peru accounted for about 59 percent of total output in January-May 1965. Most of the principal countries producing fish meal submit data to the International Association of Fish Meal Manufacturers monthly (see table).

#### FOOD AND AGRICULTURE ORGANIZATION

#### DEPARTMENT OF FISHERIES APPROVED BY FAO COUNCIL:

The Forty-Fourth Council Session of the Food and Agriculture Organization (FAO) met June 21-July 2, 1965, and approved the elevation of its Fisheries Division to departmental

## International (Contd.):

status with an Assistant FAO Director-General for Fisheries in the 1966-67 biennium. The vote of the Member Governments of the Council was 19 for departmental status, 7 against, and 1 abstention. The Council also approved the establishment of the Permanent Committee on Fisheries under Article V of the FAO Constitution and generally endorsed the Director-General's proposals for strengthening fisheries within the Organization. Those matters will now be brought before the 13th Session of the FAO Conference, to be convened November 20-December 10, 1965, and will be subject to final approval.

Although the resolution calling for an FAO Department of Fisheries in the 1966-67 biennium lacked unanimity, there was almost unanimous agreement that fisheries should be strengthened within FAO, that FAO should become the leading intergovernmental body in fisheries, and that a Permanent Committee on Fisheries should be formed.

Member countries represented at the FAO Council Session were Argentina, Brazil, Canada, Costa Rica, Ethiopia, Federal Republic of Germany, Finland, France, Greece, India, Iran, Italy, Japan, Jordan, Korea, Lebanon, Malaysia, Morocco, New Zealand, Nigeria, Pakistan, Peru, Poland, Senegal, United Kingdom, United States, and Venezuela. Many other countries and international organizations attended as observers.

Note: See Commercial Fisheries Review, Feb. 1964 p. 61.

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#### INDO-PACIFIC FISHERIES COUNCIL INVITED TO HOLD 12TH SESSION IN HAWAII IN 1966:

The United States has issued an invitation to the Indo-Pacific Fisheries Council of the Food and Agriculture Organization to hold its 12th session at the University of Hawaii in Honolulu, October 3-17, 1966.

The Indo-Pacific Fisheries Council was established under an agreement signed at Baguio, Philippines, in 1948. Its objectives are "the development and proper utilization of the living aquatic resources of the Indo-Pacific area" and the "further attainment of these ends through international cooperation." Members of the Council are: Australia, Burma, Cambodia, Ceylon, France, India, Indonesia, Japan, South Korea, Malaysia, the

Netherlands, Pakistan, the Philippines, Thailand, the United Kingdom, the United States, and South Vietnam.

Note: See Commercial Fisheries Review, April 1965 p. 48, and March 1965 p. 64.

\* \* \* \* \*

#### TRAINING COURSE IN VESSEL DESIGNING GIVEN IN SWEDEN:

A total of 18 ship designers from Asia, Africa, and Latin America were scheduled to work together from August to November 1965 in Sweden to design fishing vessels capable of catching more fish in their own countries. On August 2 they began a training course sponsored jointly by the Food and Agriculture Organization (FAO) and the Swedish Government at Chalmers' Technical University in Goteborg, Sweden. The cost of the course (about US\$60,000) was to be paid by the Swedish International Development Authority (SIDA) as a contribution to the FAO Freedom-from-Hunger-Campaign.

The chief of FAO's Fishing Boat Section said in an interview, "this is not for beginners, by any means. These students are mature men in their 30's, high-ranking officers in charge of boat development in the fisheries departments of their own countries. We have asked them to bring ideas on boat types their fishermen need to meet local conditions. Four top naval architects, headed by Course Director Clof Falkendal, will provide individual assistance in working out these designs. The result of the course may be a few new boat designs specialized for the needs of 8 countries. If we end up with one new useful idea for each country on how to produce fish more cheaply, the course will have had great economic consequence."

At the end of the course the designers will participate in the third FAO technical meeting on fishing boats to be held in Goteborg, October 23-29, 1965. Some 300 internationally-known boat experts are expected to attend the meeting. (Food and Agriculture Organization, Rome, July 20, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 57, February 1965 p. 48, Sept. 1964 p. 64.

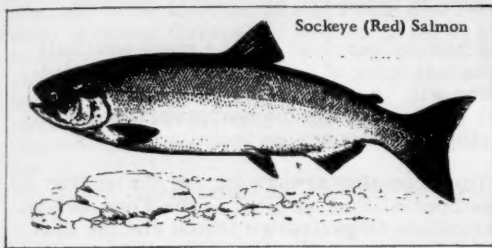
#### INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

#### FRASER RIVER SOCKEYE SALMON FISHERY TRENDS, JULY-EARLY AUGUST 1965:

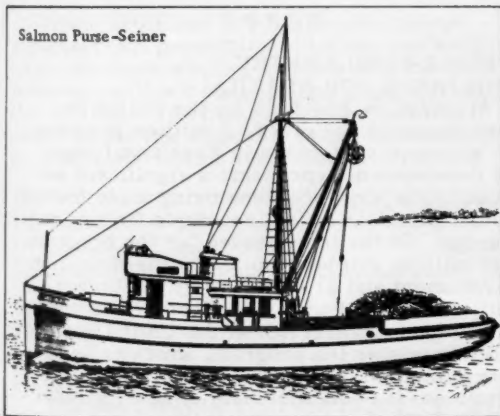
Following a light early season catch, the Fraser River sockeye salmon runs provided

## International (Contd.):

good catches for United States and Canadian fishermen in the third and fourth week of July 1965. The International North Pacific Salmon Fisheries Commission regulates the fishery so as to provide for both adequate escapement and an equal division of the catch between the two countries.



Division of the catch was creating some problems. United States Puget Sound fishermen were about 200,000 fish ahead in late July. The Commission therefore granted Canadian fishermen an additional 24 hours of fishing time in the week beginning July 25, 1965. It was expected that the opening of the Strait of Juan de Fuca to fishing in early August 1965 would also help divide the catch more equally.



Washington commercial salmon fishermen were given one more day of fishing the week of August 1 in Area 1 (northern Puget Sound east of Angeles Point), the Director of the Washington State Fisheries Department announced August 4. The additional day was granted pursuant to recommendations of the

International Pacific Salmon Fisheries Commission, because escapement has been assured for the early Stuart sockeye run (now being fished upon) and to achieve division of catch between U. S. and Canadian fishermen. Fishing is being carried out by purse seines, reef nets, and gill nets.

The International Pacific Salmon Fisheries Commission held a meeting August 2 to consider the regulations required to lessen the disparity in the Canadian catch of Fraser River sockeye. At the end of July the sockeye catch was 746,000 fish for U. S. fishermen and 535,000 fish for Canadian fishermen. The Chairman of the Commission said the smaller Canadian catch was due primarily to an increase in the efficiency of Puget Sound fishing gear which became very noticeable during last year's fishing season. He said that it had been very difficult to obtain even minimum escapements this year, in spite of lengthy closures, and that the Canadian catch had fallen behind substantially for the past two weeks.

A substantial migration of sockeye in the Fraser River on August 1 and 2 relieved the escapement problem so it was possible for the Commission to limit its regulatory considerations solely to the catch division problem for the week of August 1. (International Pacific Salmon Fisheries Commission, July 21 and 29, 1965.)

## NORTH PACIFIC FISHERIES CONVENTION

# RENEWAL OF NEGOTIATIONS ON NORTH PACIFIC PROBLEMS RECOMMENDED BY UNITED STATES-JAPAN ECONOMIC COMMITTEE:

The Fourth Meeting of the Joint United States-Japan Committee on Trade and Economic Affairs was held in Washington on July 12-14, 1965, under the Chairmanship of the U. S. Secretary of State. The meeting was the forum for a major review of trade and economic relations between the two countries, not only from a bilateral point of view, but also from a global perspective. The discussion covered a wide range of trade and economic affairs.

The North Pacific Fisheries Convention was one of the matters discussed. The Committee recalled with satisfaction that the two Governments reached an interim agreement on the East Bering Sea king crab question in November 1964, making another step forward in solving problems between the two coun-

### International (Contd.):

tries. It was agreed that, for the purposes of an early resumption of the recessed negotiations on the Convention, each side should make the preparations needed to create an atmosphere which would ensure reaching an agreement based on recognition of the legitimate interests of the United States, Japan, and Canada.

### UNITED NATIONS

#### SPECIAL FUND FISHERY PROJECT FOR THE PHILIPPINES:

The Plan of Operations for the United Nations Special Fund fishery project for the Philippines was signed May 14, 1965. Called the Deep-Sea Fishing Development Project, it will receive Special Fund assistance for 5 years, with Manila as the main operating base for the project. Biological work, fish processing and marketing investigations, and vessel designing will be carried out at appropriate facilities of the Philippine Fisheries Commission.

The Deep-Sea Fishing Development Project for the Philippines will experiment with and demonstrate different fishing techniques including purse-seining, trawling, tuna long-lining, line-bait fishing, gill-netting, troll fishing, and line fishing. Experimental fishing operations with various types of vessels and equipment will take place in the waters around the Philippine Islands. There are now 30 privately owned vessels in operation using the purse-seine method.

Fishermen will be trained on experimental fishing vessels as well as on commercial vessels and the project will be conducted in close cooperation with the industry. Approximately 400 Philippine fishermen have so far been trained in purse-seining by the United Nations Master Fisherman. The catch of the purse-seine vessels has increased by about 25,000 metric tons in one year.

During the fishing cruises scheduled under the Project, biological observations will be made on the catches for demonstration and training of counterpart staff. They will also be the basis of a program of biological sampling and assessment of the fish stocks.

Work will be done on improving methods of fish handling, preservation, and processing. The fish-processing plants of the Philip-

pine Fisheries Commission will be made available for experimental work and training purposes.

Studies will be made on improvements necessary in the wholesale and retail distribution systems to better handle increased fish supplies. Analyses will be made of probable future developments in the demand for fishery products, both geographically and in relation to types and processing methods.

Advisory services will be made available in the financing of development projects and advice will be given to the industry and to boat builders on the most appropriate vessel building and conversion techniques.

The executing agency for the United Nations Special Fund project is the Food and Agriculture Organization (FAO) and the total United Nations staff will consist of 12 experts after the project is operational.

The Special Fund allocation for the Philippine fishery project is \$1,396,900 and includes \$40,000 for 12 fellowships. Counterpart contribution by the Philippine Government in funds, services, facilities, and equipment is \$2,363,260.

Note: See Commercial Fisheries Review, May 1965 p. 55, and April 1965 p. 49.

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#### SPECIAL FUND FISHERY ASSISTANCE FOR BRAZIL:

Approval in July 1965 by the United Nations Special Fund of a \$3.5 million program for technical assistance in Brazilian fisheries development represents a significant advance in the slow progress being made toward industrialization of that country's fishery resources. Of the total needed for the program, \$1.9 million will be supplied by the Brazilian Government and \$1.6 million by the United Nations Special Fund. The Food and Agriculture Organization (FAO) of the United Nations will administer the program, which calls for reorganization of governmental fisheries institutions, the establishment of new legislation on fishing, research, training, etc.

Brazil's Director of the Superintendency of Fisheries (SUDEPE) has also announced that President Branco intends to classify the fishery industry as a base industry eligible to receive assistance from the Brazilian National Economic Development Bank. The lack of



## International (Contd.):

refrigerated storage and distribution facilities, one of the chief obstacles to expansion of fishery production in Brazil, is expected to be alleviated slightly with the start of operations later in 1965 of a large private refrigeration plant nearing completion in São Sebastião, State of São Paulo. The company plans to distribute frozen and salted fish to 12 cities in the interior of São Paulo and 3 cities in Minas Gerais, as well as to the capital city of Brasília and other localities. Meanwhile, SUDEPE is reportedly making short term loans to São Paulo fishermen for the purchase of ice, nets, and other equipment. (United States Embassy, Rio de Janeiro, August 16, 1965.)

Note: See *Commercial Fisheries Review*, May 1965 p. 55; April 1965 p. 49.

## WHALE OIL

WORLD PRODUCTION,  
1961-1964 AND FORECAST 1965:

World production of baleen whale oil during 1965 (including the 1964/65 Antarctic season) is forecast at 210,000 short tons, 16 percent below the 249,100 produced in 1964. The 1965 world sperm oil output also is forecast at a lower level--155,000 tons compared with 171,900 tons in 1964.

Those estimates are based upon the assumption that production of baleen and sperm whale oil from whaling grounds outside the Antarctic will not change significantly from that of 1964. The most important whaling area outside the Antarctic is the North Pacific, where production (especially sperm oil)

has increased in recent years because of increasing whaling activities by the U.S.S.R., in particular, but also by Japan and Canada. The U.S.S.R. and Japan operated 4 and 3 pelagic expeditions, respectively, in the North Pacific during the 1964 summer season.

The production of baleen oil in the 1964/65 Antarctic whaling season (from December 12, 1964, to April 7, 1965) totaled 165,445 tons, 17 percent (or 33,967 tons) below the previous season's outturn. All countries registered a decline. Antarctic sperm oil production in 1964/65 amounted to 54,453 tons, 18 percent (or 12,358 tons) below that of the previous season. All countries, except Norway, registered declines.

The output for the Antarctic whaling season accounted for 80 and 39 percent of the total world production of baleen and sperm oil, respectively, in 1964, as against 82 and 29 percent in 1963.

At the 17th annual meeting of the International Whaling Commission, which was held in London in June 1965, the maximum catch quota for the 1965/66 Antarctic pelagic season was reduced to 4,500 blue-whale units (from 8,000 units in 1964/65). According to the international quota agreement, the 1965/66 catch quota shall be apportioned as follows: Japan 2,340 units, Norway 1,260 units, and the U.S.S.R. 900 units. (Editor's Note: That quota applies only to factoryship operations. It does not apply to the shore stations at South Georgia.)

The U.S.S.R. and Japan are the leading world producers of whale oil. Virtually all

Table 1 - Antarctic Whale Oil Production, 1962/63 to 1964/65

Participating Country	Baleen Oil			Sperm Oil <sup>1/</sup>		
	2/ 1964-65	1963/64	1962/63	2/ 1964/65	1963/64	1962/63
..... (Short Tons) .....						
<b>Factoryships:</b>						
Japan .....	92,822	105,133	124,865	12,396	22,505	11,611
U.S.S.R. ....	32,507	40,184	58,563	30,019	31,428	17,671
Norway .....	32,802	37,940	34,636	10,767	9,421	8,140
Netherlands .....	-	8,989	11,790	-	2,888	3,278
United Kingdom .....	-	-	12,535	-	-	2,425
Total from factoryships .....	158,131	192,246	242,389	53,183	66,241	43,125
<b>Shore Stations at South Georgia:</b>						
Japan:						
Grytviken .....	2,772	3,628	-	950	277	-
Leith Harbor .....	4,541	3,538	-	320	293	-
Total from shore stations .....	7,314	7,166	-	1,270	570	-
Total Antarctic .....	165,445	199,412	242,389	54,453	66,811	43,125

<sup>1/</sup>Including catch of sperm whales north of 40° S. latitude on voyage to and from the Antarctic.

<sup>2/</sup>Preliminary.

Source: The Norwegian Whaling Gazette, No. 4, April 1965, Oslo.

## International (Contd.):

Table 2 - World Production of Whale Oil, 1961-64

Country	Baleen Oil				Sperm Oil			
	1/1964	1963	1962	1961	1/1964	1963	1962	1961
	(1,000 Short Tons)							
Japan . . . . .	127.0	140.1	143.4	126.8	51.2	42.0	37.3	34.9
U.S.S.R. . . . .	61.0	81.1	81.5	65.7	63.9	52.0	29.2	27.6
Norway . . . . .	38.3	34.9	94.6	126.4	9.8	9.2	14.0	14.6
Netherlands . . . . .	9.0	11.8	13.6	24.3	2.9	3.3	3.3	1.9
United Kingdom . . . . .	-	12.5	36.1	54.6	-	2.4	3.7	2.7
Australia . . . . .	-	.7	5.8	12.5	5.6	4.6	4.5	3.5
South Africa . . . . .	4.6	6.5	6.6	8.9	12.1	11.4	11.5	7.7
Peru . . . . .	.2	-	-	-	14.1	11.4	12.6	14.4
Chile . . . . .	2.0	.4	.3	1.6	4.8	5.3	7.0	7.1
Canada . . . . .	2.6	2.4	2.2	-	.6	.8	.9	-
Iceland . . . . .	2.0	2.3	2.3	1.1	1.6	1.5	1.5	1.7
Brazil . . . . .	.7	1.0	2.1	2.6	2/	.2	.4	.4
United States <sup>3</sup> . . . . .	1.4	.7	1.1	1.8	.2	.3	.3	.4
Portugal . . . . .	-	-	-	2/	3.0	3.3	2.8	2.6
New Zealand . . . . .	2/	.1	.3	.8	1.0	.9	2/	-
Spain . . . . .	.2	.1	.1	.5	1.0	.5	.7	.5
Denmark (Faroe Islands) . . . . .	.1	2/	2/	-	.1	.1	.1	-
World total . . . . .	249.1	294.6	390.1	427.7	171.9	149.2	129.8	119.9

1/Preliminary.

2/Less than 50 tons.

3/Including Ryukyu Islands.

Source: The Norwegian Whaling Gazette, Oslo, and International Whaling Statistics, Oslo,

the Soviet output is retained for domestic use. Japan, besides satisfying her own domestic requirements, is the major world supplier of both baleen and sperm oil. Norway and the Republic of South Africa are also important contributors to world supplies. The member countries of the European Common Market, the United Kingdom, the United States, and the U.S.S.R. account for virtually all the world's imports of whale oil.

Note: See Commercial Fisheries Review, Sept. 1965 p. 53.

## WHALING

JAPAN TO HOST 5-NATION  
WHALING CONFERENCE:

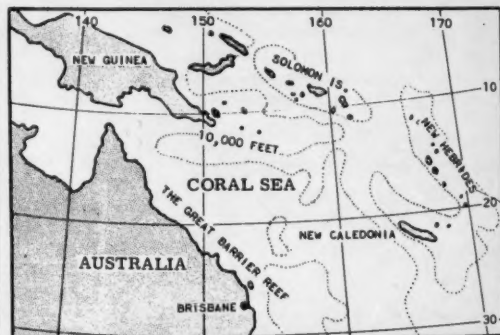
The Japanese Government agreed to host a 5-nation whaling conference September 1-8, 1965, at Tokyo to discuss the allocation of the annual whale catch quota. Invitations were sent to the Governments of the Soviet Union, Norway, Great Britain, and the Netherlands. Japan's basic position at that conference was likely to be as follows: (1) Japan will not agree to any adjustments in the allocation of the whaling quota for the 20th International Whaling Expedition (1965/66), and (2) Japan cannot but help make some concession in the whaling quota beginning with the 21st Expedition (1966/67) inasmuch as the existing agreement will then have expired; however, she will insist that in developing a new allocation formula the past 5-year record on whaling be respected. (Suisan Keizai Shimbun, August 7, 1965.)



## Australia

TUNA SURVEY IN  
NORTHERN WATERS PLANNED:

A survey of waters outside Australia's Great Barrier Reef in the Coral Sea to determine the prospects of establishing a yellowfin tuna fishery in that area was to be made jointly during summer 1965 by the Australian Federal and State of Queensland Governments.



Adult tuna are taken by the Japanese in deeper waters of the Coral Sea by the long-line method, which is little used by Australian fishermen. In 1964, an Australian mission which investigated long-line tuna fishing in Japan, Hawaii, and American Samoa, reported that, "unless the present cost-price relationship of the Australian tuna fishing industry changes substantially it is considered

## Australia (Contd.):

that Australian fishermen could not operate profitably in deep-sea long-lining for tuna on a year-round basis."

It is believed, however, that there may be important concentrations of surface-schooling juvenile yellowfin tuna just outside the Barrier Reef, and that they can be taken by the pole- and-bait method, which is now well established in Australia.

Total cost of the survey was estimated at A£34,000 (US\$76,000), with the Commonwealth providing £17,000 (\$38,000) from the Fisheries Development Trust Account, and the Queensland State Government a similar amount.

The survey was to be concentrated in Queensland waters off Gladstone, Cairns, and Townsville, over two consecutive periods of 8 weeks each scheduled to start in August 1965. The survey was to be under the technical direction of the Division of Fisheries and Oceanography of the Commonwealth Scientific and Industrial Research Organization (CSIRO). It will be administered by the Queensland Department of Harbours and Marine and a committee comprising representatives of the CSIRO. The Department of Primary Industry and the Department of Harbours and Marine will be responsible for the overall supervision.

It was planned to use an aircraft to spot tuna shoals, and a supporting fishing vessel to catch and identify the fish and obtain scientific and technical data which cannot be obtained from the air.

The first stage of the survey will be based on Gladstone and will cover the Swains, the Saumarez, the Frederick and Wreck Reefs, Cato and Lady Frederick Islands. During the second period, which will immediately follow the first, it is proposed to cover reefs off-shore between Townsville and Cairns, extending 300 miles seaward to the Lihou Reef. (Australian Fisheries Newsletter, August 1965.)

Note: See Commercial Fisheries Review, August 1965 p. 65; June 1965 p. 46.

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#### EXPORTS AND IMPORTS OF MARINE PRODUCTS, FISCAL YEAR 1964/65:

Australia's exports of marine products in fiscal year 1964/65 (July 1-June 30) increased

25 percent from the previous year to a record high value of A£10.4 million (US\$23.3 million). This was 78 percent more than the export value five years earlier.

The main reasons given for exports exceeding £10 million for the first time were the big increases in the quantity of shrimp, scallops, and canned abalone sold to overseas markets, and high prices received for frozen spiny lobster tails in the United States.

The total quantity of shrimp exported for the year was 2.4 million pounds valued at \$2.4 million, an increase of 75 percent in value as compared with 1963/64.

Scallops, a new export item for Australia, were worth \$973,000 despite a sharp decrease in shipments in June 1965 when only 82,000 pounds were exported.

The value of canned fish exports, including abalone, increased to \$370,000 in 1964/65, three times more than in the previous year.

The quantity of frozen spiny lobster tails exported dropped to the level of 1959/60 to 7.8 million pounds but the value in 1964/65 rose to \$15.2 million, or 22 percent more than the previous year.

The total value of edible marine products exported in 1964/65 was \$20.3 million compared with \$16 million in the previous year, while exports of nonedible marine products were worth \$2.9 million compared with \$2.6 million in 1963/64. Exports of whole spiny lobster dropped by 38 percent to \$625,000.

Western Australia remained the major spiny lobster exporter, contributing 78 percent of the total income earned by tails and 57 percent of the whole product.

The United States remained the main market for spiny lobster tails, taking nearly \$15 million worth in a 12-month period. France was the main outlet for whole spiny lobster with exports valued at \$412,000.

During June 1965 wholesale prices for Australian spiny lobster tails in New York City rose to \$2.52 a pound and prices went up still higher to \$2.55 a pound in July..

Japan and South Africa took most of Australia's shrimp exports in 1964/65 while France was the main buyer of scallops.

## Australia (Contd.):

While Australia's marine products exports have increased 78 percent in the past 5 years, imports of fishery products are estimated to have increased 67 percent during the same period. To the end of May 1965, imports for the first 11 months of the year were valued at £12.5 million (\$27.9 million), an increase of 13 percent over the previous year. (Austrian Fisheries Newsletter, August 1965.)

Notes: (1) Values converted at rate of A\$1 equals US\$2.24.  
(2) See Commercial Fisheries Review, Aug. 1965 p. 67; Jan. 1965 p. 63.



## Canada

### NEW BOTTOMFISH STOCKS LOCATED OFF BRITISH COLUMBIA:

The 80-ton chartered trawler Ocean Traveller sailed July 10, 1965, to begin bottomfish explorations off the east coast of the Queen Charlotte Islands of British Columbia. The study was sponsored by the Canadian Department of Fisheries.

Working in depths of 38-55 fathoms and using bobbin gear with 14-inch rollers, the vessel located commercial stocks of grey cod 7 miles northeast of Reef Island. Hauls of 7,000 pounds were taken in 10 minutes. Important stocks of brill were located in the same area.

The Ocean Traveller supplemented exploratory work with sampling and tagging to identify bottomfish stocks and routes of migration off British Columbia.

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### FISHERMEN'S IMPROVEMENT LOANS ACT LIBERALIZED:

A more liberal policy in granting loans to fishermen under provision of the Fishermen's Improvement Loans Act of 1955 was announced in mid-1965 in the House of Commons by Canada's Minister of Fisheries.

The Act was established to provide for long-term, low-interest loans to fishermen for the purchase or improvement of vessels, equipment, or materials used in their fishing enterprise. The latest amendments to the Act raised the borrowing power of a fisherman from the former C\$4,000 to a new ceiling

of \$10,000. The repayment period has been extended to 10 years from the former maximum of 8 years and the interest rate remains unchanged at 5 percent. The Act has been extended for another 5 years until June 30, 1970. (Canadian Department of Fisheries, Vancouver, August 4, 1965.)

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### SEAWEED PROCESSING PLANT FOR PRINCE EDWARD ISLAND:

Establishment of an experimental seaweed processing plant at Miminegash, Prince Edward Island, was announced July 30, 1965, by the Canadian Fisheries Minister and Minister of Mines and Technical Surveys. The plant, which will process Irish moss and other types of seaweed, will be operated by the Industrial Development Service of the Federal Department of Fisheries. About a dozen people will be employed during the summer season, with a smaller staff during the rest of the year.

The Department of Public Works will construct a wharf and a 60 x 100-foot building at Miminegash. Part of the equipment will be a mechanical dryer for Irish moss and other seaweeds.

In its initial stages, the work carried out at the plant will involve harvesting, cleaning and preliminary processing, and experiments with weeds at various stages of their life cycles. The end product of the plant will be ready for the final extraction of alginate and carrageenin, which are used as stabilizers for products such as ice cream, jellies, pharmaceutical products, cosmetics, beer, and tooth paste. (Canadian Department of Fisheries, July 30, 1965.)

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### SALTED FISH FOR DISTRIBUTION TO COUNTRIES SUFFERING FOOD SHORTAGE:

It was reported this past summer that the Canadian Government had authorized the Fisheries Supply Board to purchase a supply of Nova Scotia-produced salted fish from 1964 production to be distributed as a Canadian relief measure to troubled parts of the world where a food shortage exists. The cost of the purchase was put at \$310,000.

The fish was originally destined for the Dominican Republic, according to the Canadian press, but got no farther than Halifax when the market was affected as a result of politi-



## Canada (Contd.):

cal disturbances in that Caribbean Island. An official of the Fisheries Support Board informed the press that the fish would not necessarily be handed over to the Dominican Republic, although he pointed out that some of it might eventually find its way there. Disposition of the fish was placed in the hands of the Canadian Department of External Affairs and the World Food Program.

The Canadian Salt Fish Exporters Association said the political situation in the Caribbean area had been hurting salt fish exporters.



## Ceylon

NEW HARBORS FOR FISHING  
VESSELS PLANNED:

The Ceylon Fisheries Corporation, a State-owned organization, proposes to build 34 fisheries harbors and has called for bids on preliminary survey work.

The proposed harbors would include 2 Grade A" harbors with a draft of 20-25 feet for offshore tuna vessels and trawlers; 12 "Grade B" harbors with a draft of 10-12 feet for coastal vessels; and 20 "Grade C" harbors with a draft of 6-7 feet for small craft.

The preliminary investigations will consist of: (1) a complete hydrographic survey; (2) studies of the sediment transport and littoral drift; (3) measurement of wind and waves; and (4) soil and subsoil investigations.

The Ceylon Fisheries Corporation estimates that the expenditure on the investigations will amount to about Rs. 3 million (US\$630,500) and that the investigations, harbor designs, and other work should be completed within 3 years. (United States Embassy, Colombo, August 20, 1965.)



## Chile

RELIEF MEASURES APPROVED FOR  
DEPRESSED FISH MEAL INDUSTRY:

With a prolonged anchoveta shortage causing a severe crisis in the Chilean fish meal

industry, the Production Development Corporation of Chile (CORFO) has authorized the following relief measures:

- (1) moratorium on certain debts of vessel and plant owners;
- (2) subsidy payments to anchoveta seiners;
- (3) payment of part of the export bonus provided in the Fisheries Law.

While giving some relief, those measures will not solve the basic problem created by the anchoveta shortage. A statistical analysis indicates that the annual anchoveta catch needed to sustain the Chilean fish meal plants and fleet at the break-even point is 1.9 and 1.4 million tons, respectively. By contrast, the record anchoveta catch of 1964 amounted to only 0.9 million tons.

The most critical period for the Chilean fish meal industry is expected in December when the main anchoveta fishing season traditionally begins. If anchoveta return in sufficient number, the industry may yet recover and fulfill the hopes of its developers. (United States Embassy, Santiago, July 27, 1965.)

Note: See Commercial Fisheries Review, Sept. 1965 p. 59.

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## JAPANESE JOINT WHALING VENTURE:

A Japanese whaling company was scheduled to conduct a joint whaling venture in Chile in fall 1965 with a Chilean firm for the second consecutive year under an agreement concluded in 1964. The Japanese firm has filed a license application with the Fisheries Agency to operate a fleet of 5 whale catchers and 1 freezer factoryship off Chile from September 1965.

Under the joint venture agreement, the Japanese firm will sell its whale catch to the Chilean firm for processing, and repurchase about 8,000 metric tons of frozen whale meat for shipment to Japan. Catch target--480 baleen whales. (Suisan Keizai Shimbun, July 23, 1965.)



## Cuba

### SOVIET-CUBAN FISHERY AND OCEANOGRAPHIC RESEARCH IN GULF OF MEXICO AND CARIBBEAN:

In July 1964, a Joint Soviet-Cuban Oceanographic and Fishery Expedition was organized for work in the Gulf of Mexico and the Caribbean Sea. The authority for the research program was granted under an agreement on technical and scientific cooperation concluded between the Soviet Academy of Sciences and the Cuban Academy of Sciences earlier in 1964. In addition to those two organizations, several other Cuban and Soviet scientific institutes collaborated.

The two Soviet research vessels participating were Akademik A. Kovalevskii, with 22 scientists, and Mikhail Lomonosov with over 60 scientists. The first vessel conducted biological, hydrochemical, and hydrogeological studies on the Continental Shelf near Cuba, in the vicinity of the Campeche Banks off Mexico, and off the west coast of Florida; it also investigated deep-sea areas adjacent to the Antilles and the Bahamas. Biological samples and data obtained at sea were studied aboard the vessel and in the laboratories of the Cuban Marine Biological Institute (affiliated with the Cuban Academy of Sciences). Cuban biologists from the Institute, several of whom women, participated in the Kovalevskii's 9 research cruises, each of which lasted about 1 month. The Soviet oceanographic research vessel Lomonosov participated in only one cruise. The Lomonosov brought a delegation of Soviet scientists to attend the dedication at Havana of the Cuban Oceanographic Institute, which contains 28 laboratories with modern scientific equipment and provides working facilities for over 100 Cuban and Soviet marine scientists.

In addition, two Cuban research vessels, the Delfin and the Fidias, also conducted investigations coordinated with the overall research plan. (The Delfin, a tuna clipper, was bought from Japan along with 4 other tuna vessels in 1962.)

Soviet and Cuban marine scientists discovered new fishing grounds and planned ways to catch more crab, lobster, and shrimp. Maps of new fishing areas indicating the distribution and concentrations of various species were made. Oceanographers obtained data on the geomorphology and geological structure of sea bottom off Cuba. Most of the

practical information was turned over to Cuba when field research was completed in mid-August 1965. The scientific information collected will continue to be analyzed in Cuban and Soviet institutes for several years.

Note: See Commercial Fisheries Review, April 1964 p. 66.



## Denmark

### EXPORTS OF FISHERY PRODUCTS AND BYPRODUCTS, JANUARY-JUNE 1965:

Exports to All Countries: Denmark's total exports of fishery products and byproducts to all countries in the first half of 1965 amounted to 167,086 metric tons valued at 372 million kroner (US\$53.9 million). As compared with the same period in 1964 this was an increase of 8 percent in quantity and 22 percent in value. The export value of fresh and frozen fishery products--the two most important categories--was up 11 percent and 25 percent, respectively, although the quantities were almost the same as in the same period of 1964. In 1965, higher prices were received for species such as cod, herring, and plaice. Pond trout production in 1965 expanded at a faster rate than the export market could absorb and as a result prices were lower.

Table 1 - Danish Fishery Products Exports to all Countries, January-June 1965

Product	1/January-June 1965			January-June 1964		
	Qty.	Value		Qty.	Value	
	Metric Tons	1,000 Kr.	US\$ 1,000	Metric Tons	1,000 Kr.	US\$ 1,000
<b>Fresh, Frozen, &amp; Cured:</b>						
Fresh fish . . .	93,386	179,773	26,067	94,231	162,368	23,543
Frozen " . . .	24,601	105,838	15,347	24,641	84,340	12,229
Salted " . . .	2,482	10,951	1,588	1,683	6,319	816
Smoked " . . .	354	5,272	764	297	4,414	640
<b>Canned Products:</b>						
Fish . . . . .	3,023	11,718	1,699	2,918	10,825	1,570
Shellfish . . .	931	7,499	1,087	609	4,565	662
<b>Semipreserved Products:</b>						
Fish . . . . .	909	6,032	875	695	4,158	603
Shellfish . . .	468	3,363	488	434	2,562	372
<b>Other Products:</b>						
Fish meal, solubles, ensilage, and trout food	40,932	41,744	6,053	29,064	25,739	3,732
<b>Total . . .</b>	<b>167,086</b>	<b>372,190</b>	<b>53,968</b>	<b>154,572</b>	<b>305,290</b>	<b>44,267</b>
	January-May 1965			January-May 1964		
Fish oil <sup>2/</sup> . . .	18,074	23,318	3,381	11,015	12,994	1,877

<sup>1/</sup>Preliminary data from Ministry of Fisheries.

<sup>2/</sup>Fish oil data are shown separately because they are collected by another Ministry and often are delayed.

Note: One Danish krone equals US\$0.145.

Exports of fish meal and fish oil during the period were higher both in quantity and value, particularly fish oil because of higher international market prices.

## Denmark (Contd.):

Destination	1/ January-June 1965		January-June 1964	
	Value		Value	
	1,000 Kr.	US\$ 1,000	1,000 Kr.	US\$ 1,000
By Economic Groups:				
Common Market (EEC) . .	155,000	22,475	131,000	18,995
European Free Trade Assn. (EFTA - including Finland) . . . .	166,000	24,070	126,000	18,270
East Bloc countries . . . .	14,000	2,030	12,000	1,740
Other countries . . . . .	38,000	5,510	36,000	5,220
Total . . . . .	373,000	54,085	305,000	44,225
Major Importers by Country:				
West Germany . . . . .	100,000	14,500	81,000	11,745
United Kingdom . . . . .	70,000	10,150	58,000	8,410
Sweden . . . . .	58,000	8,410	40,000	5,800
Italy . . . . .	24,000	3,480	22,000	3,190
Switzerland . . . . .	25,000	3,625	20,000	2,900
United States . . . . .	19,000	2,755	14,000	2,023

1/ Preliminary.

**Exports to the United States:** Exports of Danish fishery products to the United States rose 44 percent in quantity and 36 percent in value during the first half of 1965 as compared with the same period in the previous year. Exports of cod fillets, mostly as frozen fish blocks, were up 46 percent in quantity and 85 percent in value and accounted for more than half the exports to the United States. More pond trout and canned herring went to the United States than in the same pe-

riod of 1964 but exports of flatfish and Norway lobster were lower. Increased pond trout production during the period helped Danish trout producers meet competition in the United States market from Japanese trout producers and to recover some of the trade lost in 1964.

**Exports to Economic Groups and Major Countries:** The EFTA trading partners of Denmark superseded the Common Market (EEC) as the leading market for Danish fishery products in the second quarter of 1965 after the Common Market led narrowly in the first quarter of the year. The EFTA (including Finland) increased the value of its imports by 32 percent as compared with the first half of 1964 and by 9 percent over the first quarter of 1965. For the Common Market the increase was 18 percent over the first half of 1964, but 6 percent less than the first quarter of 1965.

In the first half of 1965, West Germany maintained its substantial margin as the leading importing country, 43 percent more than the United Kingdom, the next largest importer. Swedish imports increased 45 percent. Switzerland, Italy, and the United States also increased their imports of Danish fishery products in the first half of 1965. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, July 21, 1965.)

Note: See *Commercial Fisheries Review*, Aug. 1965 p. 70; July 1965 p. 64; Oct. 1964 pp. 53-55.

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Table 3 - Danish Fishery Products Exports to the United States, January-June 1965

Product	1/ January-June 1965			January-June 1964		
	Qty. Metric Tons	Value		Qty. Metric Tons	Value	
		1,000 Kr.	US\$ 1,000		1,000 Kr.	US\$ 1,000
<b>Fresh &amp; frozen:</b>						
Fillets:						
Cod	2,648	10,544	1,529	1,811	5,702	827
Other fillets	11	54	8	85	370	54
Pond trout	359	2,182	316	226	1,784	259
Flatfish 2/	106	1,005	145	164	1,414	205
Norway lobster	47	1,129	164	107	2,020	293
Other	52	581	84	1	75	10
<b>Cured products:</b>						
Salted & smoked 3/	6	44	6	21	77	11
<b>Canned products:</b>						
Herring & sprat	342	1,593	232	269	1,282	186
Shrimp	60	598	87	67	664	96
Mussels	67	298	43	31	177	26
Other	11	68	10	10	58	8
<b>Semipreserved products</b>						
Fish solubles	16	189	27	8	95	14
	450	468	68	100	96	14
Total exports to U. S.	4,175	18,751	2,719	2,900	13,814	2,003

1/ Preliminary data from Ministry of Fisheries.

2/ Mostly turbot, brill, plaice, and sole.

3/ Mostly cod, salmon, other trout, eels.

FISHERY TRENDS,  
JANUARY-JUNE 1965:

**Landings:** Fishery landings in local ports by Danish vessels during the first half of 1965 were up 19 percent from the same period in 1964 because of substantially higher landings of industrial fish, especially sand eels. Danish fishermen caught greater quantities of cod, herring, shrimp, and cod-like species, but catches of flatfish, brisling, and mackerel were lower. Foreign vessels, mainly Swedish, landed only slightly more fish in Danish ports than in the first 6 months of 1964. Danish direct landings in foreign ports, mostly British, were down considerably because of delays encountered in landing their catches.

Ex-vessel prices were generally high in January-June 1965. Plaice prices were maintained at high levels because two of Eu-

## Denmark (Contd.):

rope's largest fish firms competed for supplies. Independent Danish producers and exporters of frozen plaice fillets had some difficulty in obtaining supplies to meet their needs.

Table 1 - Danish Fishery Landings, January-June 1965 with Comparisons

Species	January-June	
	1965	1964
.. (Metric Tons).		
<b>Landings in Denmark by Danish vessels:</b>		
Flatfish 1/	26,780	32,257
Cod	46,709	42,258
Cod-like fish 2/	26,360	17,665
Herring	130,261	117,547
Brisling	1,642	4,071
Mackerel	2,514	2,958
Eels	478	546
Salmon	714	558
Pond trout	5,156	4,236
Other fish 3/	154,300	109,110
Norway lobster	733	1,015
Shrimp	2,880	2,050
Mussels	8,223	7,965
Other shellfish	1,766	2,228
<b>Total</b>	<b>408,516</b>	<b>344,464</b>
<b>Landings in Denmark by foreign vessels:</b>		
	90,186	88,513
<b>Total landings in Danish ports</b>	<b>498,702</b>	<b>432,977</b>
<b>Landings in foreign ports by Danish vessels:</b>		
	1,669	2,831

1/Plaice, flounder, dab, common sole, etc.

2/Haddock, coalfish, hake, ling, etc.

3/Mostly industrial fish such as sand eels, Norway pout, etc.

The record production of pond trout in the first half of 1965 resulted from improved operations, including the use of dry feed. This resulted in lower prices as Danish exporters were unable to increase sales of pond trout. Danish pond trout producers became the first industry segment to seek assistance through the recently passed minimum fish export price legislation which became effective July 1, 1965.

**Processing:** Production of most processed items was higher during the first half of 1965

Table 2 - Danish Production of Processed Fishery Products, January-June 1965

Product	January-June	
	1965	1964
.. (Metric Tons).		
<b>Canned:</b>		
Herring & sprats	1,542	1,801
Mackerel	496	325
Other fish	2,948	3,011
Mussels	301	258
Other shellfish	776	582
<b>Total</b>	<b>6,063</b>	<b>6,077</b>

(Table continued in next column.)

Product	January-June	
	1965	1964
.. (Metric Tons).		
<b>Semi-preserved:</b>		
Herring & sprats	2,758	2,246
Other fish	237	224
Mussels	360	318
<b>Total</b>	<b>3,355</b>	<b>2,788</b>
<b>Fresh &amp; frozen fillets:</b>		
Cod	16,449	14,138
Cod-like fish 1/	1,732	758
Plaice	7,752	7,152
Other flatfish	1,002	486
Herring	24,257	16,603
Other fish	102	132
<b>Total</b>	<b>51,294</b>	<b>39,269</b>
<b>Smoked:</b>		
Herring & sprats	826	822
Mackerel	713	662
Eels	303	341
Salmon & trout	374	222
Other fish & shellfish	169	121
<b>Total</b>	<b>2,385</b>	<b>2,168</b>
<b>Miscellaneous:</b>		
Force meat 2/	992	772
Salted herring	14	11
Dry-salted cod	158	394
Other fishery products	844	3,790
<b>Total</b>	<b>2,008</b>	<b>4,967</b>
<b>Industrial products:</b>		
Meal	54,735	39,582
Oil	13,629	10,555
Ensilage 3/	2,308	3,018
Solubles	7,353	4,905
<b>Total</b>	<b>78,025</b>	<b>58,060</b>

1/Haddock, coalfish, hake, ling, etc.

2/Ground fish, milk, and flour.

3/Chemically treated raw fish.

Source: Ministry of Fisheries.

than in 1964 because of increased export demand. The larger increase was in the fresh and frozen fillet category which was up 30 percent as more cod, herring, and plaice were filleted. Larger landings of herring and sand eels in the first half of 1965 increased the production of fish meal, solubles, and oil considerably. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, July 27, 1965.)

Note: See *Commercial Fisheries Review*, July 1965 p. 64; Oct. 1964 pp. 53-55.

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### SURPLUS SUPPLIES OF POND TROUT FOR EXPORT REDUCED:

The surplus of about 2.2 million pounds of Danish pond trout reported by producers in Denmark in July 1965 later appeared to no longer be a problem. This was according to reports from the August 11, 1965, extraordinary general meeting of Dansk Andels Ørredesport, a cooperative that produces and sells about 45 percent of the Danish pond trout. But cooperation throughout the industry is necessary to stabilize prices. In an effort to achieve such cooperation, it was urged that there be a meeting of all Danish pond trout producers on August 30, 1965, in



## Denmark (Contd.):

Brande where the cooperative has a modern trout-processing plant.

At the August 11 meeting, members of the cooperative were informed of the results of operations during the first 6 months of 1965. It was stated that the average price paid for pond trout to members during that period was 4.02 kroner a kilo (26.4 U. S. cents a pound) with about 0.50 kroner a kilo (7.25 cents a pound) available for later payment, or a total of about 33.69 cents a pound.

A July 20 meeting of trout producers and exporters with the Fisheries Ministry to request establishment of minimum export prices did not bring any results. The Fisheries Minister pointed out he could not act until the two associations--Trout Producers Association of 1965 and the Danish Trout Exporters Association--were in agreement on (1) what steps they wished taken under the provisions of the new export legislation, and (2) a joint representative on the Export Committee provided for in the law.

At a later meeting of the association, it was reported that the prospects for establishment of a single organization appeared good. There was sentiment for a suggested export price initially, to be followed later by prices established on a broader basis. Agreement had not been reached, however, on the operation of a minimum price pool. Most believed that producers with a surplus which could not be sold at minimum prices could only be reimbursed at lower than minimum prices in order to preclude unlimited overproduction. A few still were not sure this loss was unavoidable. Meanwhile another meeting of the associations was expected soon.

Denmark's exports of pond trout during the first 6 months of 1965 amounted to 5,100 metric tons (11.2 million pounds) valued at 37.2 million kroner (US\$5.4 million), up 24 percent in quantity and 12 percent in value as compared with the same period in 1964. Exports to the United States in the first half of 1965 totaled 791,000 pounds valued at \$316,000, an increase of 59 percent in quantity and 22 percent in value as compared with 1964. The total pond trout export data show a loss of about 10 percent in average prices from 1964 to 1965, while those for exports to the United States show a loss of about 23 percent. The United States imports only frozen

pond trout from Denmark while other countries receive live, fresh, and frozen pond trout. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, August 13, 1965.)

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**NEW FISHERIES LAWS ON  
FISHING LIMITS, EXPORTS, AND QUALITY:**

Three new Danish laws affecting the catching, quality, and exporting of fish and fishery products became effective July 1, 1965. They do not apply in the Faroe Islands or Greenland, except that most of the quality control law applies in Greenland.

**Salt-Water Fisheries Law:** The new law, which brings up to date 1951 legislation, applies to all Danish fishery waters except those covered by the fresh-water fisheries law. It authorizes an extension of Danish fishery waters in the North Sea, Skagerrak, and Kattegat to 12 nautical miles from the base line of the territorial sea. The extension to 12 miles will not become effective until proclaimed by the Fisheries Minister. As of mid-August 1965, Denmark had not extended its fishing limits. Discussions were still being held with Norway over fishing rights in the area that would be affected by the extension.

Under the new law, only Danish citizens, organizations controlled by Danish citizens, or residents of Denmark for the last 2 years may (1) conduct fisheries in Danish waters, or (2) process or transfer fish within Danish fisheries limits, or (3) transport fish or fishery products directly from the sea through Danish fishery waters to Danish ports. Vessels used in such operations must be Danish and two-thirds of the crew must be Danish citizens or 2-year residents. But exceptions to those rules may be made by the Fisheries Minister in the interest of fisheries development, or as a result of agreements with other countries.

Minimum legal sizes for salt-water species are specified in the new law.

Most violations of the law, including those by foreign vessels, are punishable by fines, although gear and catch may be confiscated in certain cases.

Each fisherman is required to supply the Fisheries Ministry with information about his vessel, gear, catch, and sales.

## Denmark (Contd.):

The law became effective July 1, 1965 but does not apply in Greenland or the Faroe Islands.

**Export of Fish and Fishery Products Law:** This new Law was enacted at the request of the fishing industry to provide a means for correcting difficulties arising from export surpluses--especially for pond trout and herring.

The new law provides that the Fisheries Minister may establish minimum fishery export prices after a request by a representative fisheries association and review by an appointed Export Committee. Exporters guilty of gross or frequent violations of the export regulations may have their permission to export fishery products withdrawn.

The first attempt to use the law was made by an association of pond trout producers. Their request was denied by the Fisheries Minister because it was not supported by a group of pond trout exporters, and no trout industry representative had been agreed upon for the Export Committee. The two trout associations have met to reconcile their differences.

The law became effective July 1, 1965, but does not apply in Greenland or the Faroe Islands.

**Quality Control of Fish and Fish Products Law:** This legislation replaces the May 11, 1954, law on the same subject. The new law had general industry and Government support as a means of maintaining or improving the reputation of Danish fish for high quality. Its enactment updates definitions, regulations, techniques, and methods described in the earlier legislation. In general, it maintains or expands provisions of general interest while omitting the detailed regulations which are subject to frequent change because of industry developments. The Fisheries Minister has been authorized to establish the latter type of regulations administratively. They include the detailed rules for handling fish on shipboard and ashore, transportation, processing plants, packaging, and labeling.

The law applies to domestic fish production and processing, and to exported and imported fish and fishery products. It covers both food and industrial fish and also includes foods prepared for feeding fish. (The latter products

are important in Denmark because of the large pond trout industry). Inspections relating to law enforcement are functions of the Fisheries Ministry's Control and Inspection Services. A Quality Committee, consisting of 6 industry representatives and one each from the National Health Service and the Fisheries Ministry, function as directed by the Fisheries Minister. The Minister may also require submission of information on the production and disposition of fish and fishery products.

The law became effective July 1, 1965, in Denmark and Greenland. The law is not effective in the Faroe Islands. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, August 18 and 19, 1965.)

Note: See Commercial Fisheries Review, Sept. 1965 p. 59.



## France

## FISH MEAL AND OIL PRODUCTION AND IMPORTS, 1964:

Production of fish meal in France during 1964 totaled an estimated 12,000 metric tons as against an estimated 8,000 tons in 1963. Production, which is concentrated along the northern coast, is based mainly upon offal and waste from the preparation of fish for human consumption. France is largely dependent on fish meal imports to satisfy its requirements. Imports of fish meal in 1964 totaled 104,835 tons as against 76,512 tons in 1963.

Production of cod oil in 1964 amounted to 3,321 tons compared with 1,188 tons in 1963. Production of other types of marine oil in France is reported to be insignificant. French needs for fish oil are met by imports, which totaled 29,289 tons in 1964 compared with 29,990 tons in 1963. (U. S. Department of Agriculture, August 2, 1965.)



## Iceland

## EXPORTS OF FISHERY PRODUCTS, JANUARY-MARCH 1965:

During January-March 1965, there was an increase in exports of salted fish, salted fish fillets, stockfish, canned fish, frozen herring, and herring oil, as compared with the same period in 1964, according to the Icelandic Statistical Bulletin, May 1965. Exports of fro-

## Iceland (Contd.):

Product	Jan.-Mar. 1965			Jan.-Mar. 1964		
	Qty.	Value f.o.b.		Qty.	Value f.o.b.	
	Metric Tons	1,000 Kr.	US\$ 1,000	Metric Tons	1,000 Kr.	US\$ 1,000
Salted fish, dried	1,494	30,371	705	535	13,714	318
Salted fish, uncured	2,430	41,870	971	2,067	32,976	765
Salted fish fillets	798	14,002	325	463	6,703	156
Wings, salted	74	1,081	24	219	2,937	68
Stockfish	3,015	86,470	2,053	2,390	68,820	1,597
Herring on ice	-	-	-	19	140	3
Other fish on ice	11,061	62,957	1,461	10,303	58,710	1,362
Herring, frozen	8,323	55,525	1,242	7,721	45,987	1,067
Other frozen fish, whole	1,562	16,897	438	702	8,773	204
Frozen fish fillets	0,177	217,159	5,038	11,832	252,282	5,853
Shrimp and lobster, frozen	102	10,441	242	165	16,022	372
Roos, frozen	284	4,993	116	316	6,831	158
Canned fish	191	8,613	200	45	2,235	52
Cod-liver oil	1,195	13,059	303	1,351	12,536	291
Lumpfish roes, salted	-	-	-	3	81	2
Other roes for food, salted	124	1,940	45	981	15,195	353
Roos for bait, salted	-	-	-	-	-	-
Herring, salted	7,874	81,722	1,896	13,905	136,314	3,209
Herring oil	9,494	79,602	1,847	4,807	36,233	887
Ocean perch oil	-	-	-	28	188	4
Whale oil	774	6,698	155	2,101	18,675	433
Fish meal	4,056	26,442	613	5,486	29,429	683
Herring meal	23,362	159,804	3,707	26,564	149,237	3,462
Ocean perch meal	-	-	-	109	621	14
Wastes of fish, frozen	620	2,090	48	257	1,081	25
Liver meal	174	1,233	29	143	943	22
Lobster and shrimp meal	25	124	3	87	346	8
Whale meal	311	1,889	44	630	3,514	82
Whale meat, frozen	108	802	23	49	378	9

Note: Values converted at rate of 1 krona equals 2.32 U. S. cents.

zen fish fillets, salted herring, whale oil, fish meal, herring meal, and whale meal showed a considerable decrease in the first 3 months of 1965.

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## MINIMUM EX-VESEL SUMMER

## HERRING PRICES IN 1965:

For the 1965 summer fishery, the Icelandic Price Control Board established one series of minimum ex-vessel prices for the north and east coast, and another price series for the south and west coast.

North and East Coast: In this area, minimum ex-vessel herring prices from June 10 to September 30, 1965, were as follows:

Herring for freezing and salting Kr. 257 (US\$5.97) per barrel (120 liters which is about 32 gallons or 245 pounds). For a fully salted barrel of herring, the minimum price was Kr. 350 (\$8.13).

Herring for reduction Kr. 235 (\$5.46) per mal (150 liters which is about 40 gallons or 310 pounds), less an assessment of Kr. 3 (7 U. S. cents) for the Herring Transport Fund. For transporting herring to the north coast when the east coast reduction factories are full, fishing vessels receive an additional Kr. 25 (58 cents) per mal of which 60 percent is paid by the Transport Fund and the remainder by the receiving factory.

South and West Coast (Hornafjordur west to Rit): Minimum prices in this area from June 16 to September 10, 1965, were:

Herring for reduction Kr. 1.4 per kilo (1.47 cents per pound).

Herring for freezing, salting, or filleting Kr. 1.65 per kilo (1.74 cents per pound).

Herring for canning Kr. 1.5 per kilo (1.58 cents per pound).

The Government of Iceland has told vessel owners that 1966 herring prices in all areas will be based on weight rather than quantity. (United States Embassy, Reykjavik, July 21, 1965.)



## Italy

## FISHERY MARKET TRENDS:

About half the total amount of fish consumed in Italy each year is supplied by the domestic fishing industry. For the past few years, production in that country has remained stable at about 200,000 metric tons a year but consumption has increased from 369,000 tons in 1961 to 394,000 in 1963. Italy's per capita consumption of fishery products, at 16.7 pounds in 1963, was well below the world average of 24 pounds.

Anchovies, sardines, molluscs, crustacean, and mackerel account for about 70 percent of the total yearly Italian catch, almost all of which is sold fresh. Tuna, which previously accounted for a small percentage of the total catch is now being sought on a large scale to satisfy the ever-growing demand. This is reflected in the recent transformation of the Italian fishing fleet.

From 1961 to 1963, the Italian motorized fishing fleet increased from 10 units in the 200- to 500-ton category to 28, from 2 units in the 500- to 1,000-ton category to 15, and from 3 units to 5 for vessels over 1,000 tons. Toward the end of 1964, 18 vessels of the 500- to 1,000-ton type and 4 over 1,000 tons were being built and were due for completion.

Over the past few years, imports of fish--fresh, frozen, and refrigerated (chilled)--have increased steadily, mainly because of the growing popularity of tuna. Italy imports frozen tuna which is canned and preserved in olive oil.

## Italy (Contd.):

Italy traditionally imports canned salmon and salted cod from Canada. In 1963, Italy's imports of canned salmon from Canada increased rather sharply because Canadian prices were more competitive. For salmon, Italy is a price market and stronger competition from Japan, and especially the Soviet Union makes it more and more difficult for Canadian exporters to sell in the Italian market.

Italy's imports of salted cod from Canada have been rather limited because of the higher standard of living in Italy and better freezing facilities. Italy's imports of salted cod totaled about 1,000 metric tons in 1964. That market is always open to good quality low-priced salted cod. (Foreign Trade, Canadian Department of Trade and Commerce, Ottawa, August 7, 1965.)

Note: See Commercial Fisheries Review, April 1965 p. 59; March 1965 p. 63.



## Ivory Coast

## FISHERY TRENDS IN 1964:

Fishery landings in the African State of Ivory Coast in 1964 totaled 38,116 metric tons, a 26-percent increase over the 30,000 tons landed in 1963. These were by the Abidjan-based commercial fishing fleet made up of 31 trawlers, 35 seiners, and 4 tuna vessels. Principal species were sardines and herring which accounted for about half the total landings, some tuna, and other miscellaneous species.

In addition and not included in the landings as reported by the Ivory Coast Fisheries Service, an estimated 6,500 tons of tuna was transshipped from Abidjan in 1964 to canneries in Europe and Puerto Rico. This compares with tuna transshipments of 5,500 tons in 1963.

Heaviest landings during 1964 were in October-November when over 4,000 tons were caught in each of those months. The months of lightest landings were in June and February when the catch totaled 2,500 tons for each month.

The year 1964 saw the opening of the first phase of an ambitious program of fishery development planned for the future. This was the 1,300-foot dock and fuel facility at the new

"Port de Peche" (Fishing Port) which is now in full operation. The construction of a new 3,000-ton storage capacity freezer plant is planned, with construction to start in late 1965. Other plans include another 1,300-foot extension of the dock, a tuna cannery, a fish meal plant, a can-making plant, and a frozen fish-distribution system extending into the interior of the country. (Regional Fisheries Attache for Africa, United States Embassy, Abidjan, May 8, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 68; March 1965 p. 75; October 1964 p. 60.



## Jamaica

## FISHERIES SITUATION:

The fisheries of Jamaica are underdeveloped and fall far short of supplying domestic needs. Imports fill the gap. Those imports in 1964 included 16.8 million pounds of dried salted cod, mostly from Canada. The 1964 imports also included canned fishery products valued at US\$18.6 million over 75 percent of which came from Canada. Canned products displayed by Jamaican super-markets include salmon, mackerel, sardines, and herring from Canada, sardines from the United States, and tuna from Peru.

Jamaican Retail Prices of Canned Fish		
Product	Can Size	U.S. Cents
<u>Salmon (all from Canada):</u>		
Pink	15½-oz. tall	67 to 77
	7½-oz.	35 to 42
Cohoe	15½-oz. tall	107
	7½-oz.	64
Red	7½-oz.	70
<u>Mackerel:</u>		
Canadian	15-oz. tall	28
Japanese	7½-oz.	18
<u>Sardines:</u>		
California:	5-oz., tomato	12½
	5-oz., chile	14
Japanese	7½-oz., oval	18
Canadian (Atlantic) herring	7-oz., oval	18
<u>Tuna (Peru):</u>		
Solid pack	7-oz.	25
Chunks	6½-oz.	27

Jamaica probably has more than sufficient fishery resources to supply its domestic needs. Abundant supplies of bottomfish have been found on nearby banks by the exploratory ves-



## Jamaica (Contd.):

sel Blue Fin operated by the Fisheries Division of the Jamaican Government. Since those banks are coral, the Fisheries Division has encouraged the development of pot or trap fishing. That method and beach seining are the two most common types of fishing in the area.



Fig. 1 - Port Royal, Jamaica, fishermen use these canoes to fish with traps and beach seines.

Dependence on a fishing fleet of dugout canoes is one of the main factors limiting Jamaican fishermen. The Fisheries Division is administering a scheme to finance outboard motors for the canoe fishermen, but change comes slowly. The advantages of modernization are illustrated by a progressive group of pot fishermen based at Whitehorse. With mechanization, they are able to fish a large and reportedly productive area about 90 miles offshore.



Fig. 2 - There is a beach seine fishery out of Greenwich Fishing Beach, Kingston, Jamaica. Nets are used in Kingston Bay and nearby ocean beaches.

Since trawling has never proven successful, there seems to be no possibility of developing a sizable shrimp fishery. The canoe fishermen catch a few shrimp for which they are paid as much as 70 to 80 U.S. cents a pound, heads on. Frozen shrimp are actually

imported from the United States in small quantities. But there are prospects for developing and expanding a spiny lobster fishery. Jamaica is already exporting a small quantity of spiny lobsters. Domestic demand is satisfied by the local fishermen. They receive 40 to 60 U.S. cents a pound, depending on the seasonal abundance. If developed, the lobster fishery may be capable of expansion.



Fig. 3 - At Greenwich Fishing Beach, a beach-seine canoe has landed and is surrounded by buyers and fishermen.

Recent developments in Jamaican fisheries include a Government-sponsored pilot project in herring canning that was begun early in 1965. The project is located on the southeastern end of St. Thomas. The results are not yet available.

An experimental fishermen's cooperative has been established at Port Royal where a large canoe fleet is based. The organization seems to be doing a good job of getting fishing supplies for its members, but it has not yet developed market outlets as was hoped.



Fig. 4 - Beach seines drying at Greenwich Fishing Beach. Shacks are used for working on nets.

Looking to the future, Jamaica plans to participate in the development program for Caribbean fisheries sponsored by the Food and Agriculture Organization of the United Nations. (United States Embassy, Kingston, July 22, 1965.)



## Japan

### EXPORT VALIDATIONS OF FROZEN TUNA AND TUNA LOINS BY COUNTRY, APRIL-MAY 1965:

Japan's export validations of frozen tuna and cooked frozen tuna loins validated for export to all countries in April-May 1965 were up 29 percent from the same period in 1964.

Japan's Export Validations of Frozen Tuna and Tuna Loins by Country of Destination, April-May 1965						
Item	To U.S. & Canada		To Other Countries		Total	
	May	Apr.-May	May	Apr.-May	May	Apr.-May
(Short Tons)						
<b>Albacore, round</b>	5,848	6,532	1,010	2,573	6,858	9,105
<b>Yellowfin:</b>						
Round	556	650	-	-	556	650
Gilled & gutted:						
20/100 lbs.	3,478	6,466	1,004	1,397	4,482	7,863
100 lbs. up	522	876	-	-	522	876
Dred. with tail	1,025	1,887	5,333	9,102	6,358	10,989
Fillets	-	2	1	-	1	2
<b>Total</b>	<b>5,581</b>	<b>9,681</b>	<b>6,338</b>	<b>10,499</b>	<b>11,919</b>	<b>20,180</b>
<b>Big-head:</b>						
Dressed	53	135	1,062	2,612	1,115	2,747
Other	-	12	320	320	320	332
<b>Total</b>	<b>53</b>	<b>147</b>	<b>1,382</b>	<b>2,932</b>	<b>1,435</b>	<b>3,079</b>
<b>Skipjack</b>	<b>1,450</b>	<b>2,106</b>	-	-	<b>1,450</b>	<b>2,106</b>
<b>Bluefin:</b>						
Dressed	-	-	734	835	734	835
Fillets	-	-	181	181	181	181
<b>Total</b>	<b>-</b>	<b>-</b>	<b>915</b>	<b>1,016</b>	<b>915</b>	<b>1,016</b>
<b>Loins:</b>						
Albacore	50	225	-	-	50	225
Yellowfin	87	602	-	-	87	602
<b>Total</b>	<b>137</b>	<b>827</b>	<b>-</b>	<b>-</b>	<b>137</b>	<b>827</b>
<b>Grand total 1965</b>	<b>13,069</b>	<b>19,293</b>	<b>9,645</b>	<b>17,020</b>	<b>22,714</b>	<b>36,313</b>
<b>Grand total 1964</b>	<b>7,736</b>	<b>17,091</b>	<b>6,048</b>	<b>11,053</b>	<b>13,784</b>	<b>28,144</b>

Exports of 19,293 short tons validated for the United States and Canada in April-May 1965 included 334 tons shipped from American Samoa and other Japanese bases (Fiji Islands, New Hebrides, and Penang in Malaysia) in the South Pacific. (Fisheries Attache, United States Embassy, Tokyo, July 27, 1965.)

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### SKIPJACK TUNA FISHING SLOW:

Japanese skipjack tuna fishing continued poor since the season's outset, with catches off the Ogasawara Islands (south of Tokyo Bay) running negligible early in August 1965 due to the effect of a cold water mass. As a result, the ex-vessel skipjack price rose to over 80 yen a kilogram (US\$202 a short ton). Cannermen in Shizuoka Prefecture claim they cannot make any profit at that price and many are switching to peach canning. A few cannermen in Yaizu (Shizuoka Prefecture) who primarily pack tuna in oil are reported buying skipjack at 83-86 yen a kilogram (\$209-217 a

short ton) in hopes that prices may rise by 50-100 yen (\$0.14-0.28) a case.

Japanese trading firms are reported offering 1,450 yen (\$4.03) a case for skipjack tuna in oil packed in 3.5-oz. cans and 2,450 yen (\$6.81) a case for the 7-oz. pack, but due to higher prices asked by cannermen to offset increased production costs, actual sales are being transacted at around 1,550 yen (\$4.31) for the smaller pack and 2,550 yen (\$7.09) for the larger pack. (*Kanzume Nippo*, August 9, 1965.)

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### SKIPJACK TUNA LANDINGS DOWN FOR APRIL-JULY 1965:

Landings at the port of Yaizu, Shizuoka Prefecture, of pole-and-line caught skipjack tuna for April-July 1965 totaled 14,907 metric tons, or 9,754 tons below comparable 1964 landings. The Fisheries Agency's Tohoku Regional Fisheries Research Laboratory attributed the smaller landings to the scattering of fish as a result of low water temperatures and to greatly reduced effort. The reduced effort was attributed to the large numbers of skipjack vessels switching to and remaining in the albacore tuna fishery, which was excellent this year.

As a result of the smaller landings, packers reportedly were compelled to buy fish at the high ex-vessel price of 80 yen a kilogram (US\$202 a short ton). (*Kanzume Nippo*, August 20, 1965.)

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### ATLANTIC ALBACORE TUNA FISHING AND PRICE TRENDS:

The Japanese Atlantic albacore tuna fishery, which has been good this season, was reported rapidly falling off as of the latter part of July 1965. Catches off Angola, which earlier had averaged 4 tons per day per vessel declined to around 2.5 tons, and indications were the fishery might draw to a close earlier than anticipated.

The export price in July of frozen round albacore shipped to the United States was still holding at US\$290-295 a short ton f.o.b. transshipment port, but towards the end of July 600-700 metric tons of frozen albacore were sold to Spain at \$380-390 a metric ton c.i.f., corresponding to the f.o.b. (transshipment port) price of \$295-300 a short ton. (*Suisan Tsushin*, July 22, 1965.)

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Japan (Contd.):

#### PLAN TO PROMOTE DOMESTIC ALBACORE TUNA DEMAND:

The Japan Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN), at a directors' meeting held to develop measures to cope with the albacore price stabilization problem, voted to spend 100 million yen (US\$278,000) to promote albacore demand in Japan. To obtain funds for this promotion, which was launched September 1, 1965, NIKKATSUREN planned to assess tuna vessel owners 2 yen per kilogram (\$5 a short ton) of tuna landed directly in Japan or transshipped to Japan from the Atlantic Ocean. Assessment was expected to yield 170 million yen (\$472,000). (Shin Suisan Shimbun Sokuho, July 23, 1965.)

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#### FISHERY RESEARCH VESSEL TO STUDY ATLANTIC TUNA RESOURCES IN FALL 1965:

The Japanese Fisheries Agency plans to dispatch the research vessel Shoyo Maru (604 gross tons) on a 170-day cruise to the Atlantic Ocean in fall 1965 to study tuna resources. The vessel, scheduled to depart Tokyo September 25 and return to Japan March 15, 1966, will call at such ports as Colombo, Ceylon; Capetown, South Africa; Rio de Janeiro, Brazil; Port of Spain, Trinidad; Balboa, Canal Zone; and Honolulu, Hawaii.

Research objectives are: (a) study distribution, abundance, catch by fishing ground and hook rate of important species; (b) collect samples of juvenile fish; (c) conduct oceanographic and meteorological studies; (d) tag and release fish; (e) study fishing conditions at ports of call; (f) transmit fishing condition reports daily to Misaki, Shimizu, and Yaizu radio stations during fishing operations. (Suisan Keizai Shimbun, July 24, 1965.)

Note: See Commercial Fisheries Review, Oct. 1964 p. 65.

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#### EXPORTERS HANDLED 80,000 CASES OF CANNED TUNA FOR EXPORT TO U. S. IN JULY 1965:

The Standing Committee, Tuna Department, Japan Canned Foods Exporters Association, decided to handle for export to the United States in July 1965 a total of 70,000 cases of canned whitemeat tuna in brine (probably 7-oz. can size) with a promotional allowance of

US\$0.50 per case and 10,000 cases of the 4-lb. lightmeat in brine pack. Reportedly, the Canned Tuna Sales Company does not have any 7-oz. or 13-oz. lightmeat pack in stock. (Kanzume Nippo, July 28, 1965.)

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#### CANNED TUNA EXPORT MARKET TRENDS:

The Japan Canned Tuna Packers Association was scheduled to hold a directors' meeting on August 27, 1965, to decide whether to have the Canned Tuna Sales Company not accept any consignments of canned tuna in brine (for export to the United States) for the third consignment period (January 1-March 31, 1966). The consignment quota for the third period totals 460,000 cases.

The August 27 meeting was called due to large stocks of canned tuna held on consignment by the Sales Company. It was reported that the Company had on hand about 1.6 million cases of tuna as of early August. Toward year's end the stock on hand was expected to decrease to about 1.5 million cases but increase to nearly 2 million cases in January-March 1966 should the Sales Company not impose any restrictions on consignments for that period. Under existing depressed market conditions for Japanese tuna, that quantity was considered excessive.

For the August 1965 sale of canned tuna in brine for export to the United States, the Sales Company agreed to offer for sale 50,000 cases (20,000 cases of whitemeat tuna and 30,000 cases of lightmeat tuna) and to make available another 40,000 cases of whitemeat tuna carried over from the July sale. It was reported that the Company, after examining the buy offers from the exporting firms, planned to increase the quantity to about 80,000 cases (Note: It is assumed that this quantity did not include the carryover of 40,000 cases). The 80,000 cases would consist of 50,000 cases of whitemeat tuna and about 30,000 cases of lightmeat tuna. It was also reported that a promotional allowance of US\$0.50 a case was being allowed for the whitemeat pack as in the July sale. (Suisan Tsushin, August 20 & 23, 1965.)

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#### VIEWS ON POOR SALES OF CANNED TUNA IN U.S.:

Japanese tuna packers and exporters are said to be greatly concerned over the slow sales of canned tuna in brine for export to the United States, which in the current business year (December 1964-November 1965)

## Japan (Contd.):

is said to total only 1.24 million cases as of July 1965. In commenting on this situation, the chief of the Canned Tuna Department, Japan Canned Foods Exporters Association, recently expressed the following opinion:

1. The current stagnant sales of canned tuna in brine have reached a critical point never before faced by the tuna packing industry. To tide over this critical period and to save the industry from falling into ruin, packers must set aside their selfish interests and unite themselves from a broad viewpoint.

2. Japanese canned tuna prices are higher than those of U. S. products, especially those packed in Puerto Rico, by the amount of duty (12.5 percent) imposed on imports. Therefore, Japan must strive to reduce costs to close the price gap caused by this duty. However, mergers and other means of cost reduction cannot be accomplished overnight, so for the time being consideration should be given to the development of measures aimed at drastically reducing storage expenses and interest on loans, which presently amount close to US\$1 a case per year.

3. To tide over the present crisis, packers must adopt a more firm attitude, but exporters must also strive to improve their position. As regards the kind of policy the exporters should develop to cope with the present situation, I am now making a personal study of this matter but have not yet reached the point of seeking the advice of the proper agency. However, it seems to me that strict adherence to the policy of allocating quotas on the basis of past performance will not resolve this crisis. Therefore, I think it advisable that delay aside the quota system during the next six months or one year and develop a realistic sales policy. Of course, this does not mean we should eliminate the Exporters Agreement (concluded between packers and exporters and approved by the Government) or the system of allocating quotas on the basis of past performance record. I hope to thoroughly explore the Government's views on this problem and to study this matter in detail. (Suisan Tsushin, July 27, 1965.)

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#### TUNA INDUSTRY SUBMITS VIEWS ON WAYS OF STRENGTHENING INDUSTRY:

The third series of Japanese Government-industry meetings to seek ways and means of

stabilizing and strengthening the Japanese tuna industry was held at Tokyo on July 29, 1965. At that meeting, the vice-president of the National Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN) submitted for consideration for the first time industry's proposal to stabilize the fishing industry. The proposal covered seven problem areas and three items for immediate consideration.

The seven problem areas were defined as: (1) The need for the Fisheries Agency to quickly obtain funds to cover expenses necessary to conduct studies in reducing manpower requirements on tuna fishing vessels. (2) As a means of attracting and securing crew members, the need to reduce the personal income tax of fishing vessel personnel. (3) Consideration of the problem involving employment of foreign labor. (4) Government regulations prescribing vessel crew complement be carefully studied in view of the need for substantial modifications. (5) The need to strengthen management base such as by permitting vessel owners to incorporate their enterprises. (6) The need to establish a unified export sales system to handle the packers' production as a means of strengthening the marketing structure. (7) The need to develop a basic policy governing exports of fishing vessels to South Korea in view of the impact such exports would have on the Japanese tuna industry.

The three items proposed for immediate consideration were: (1) Lowering interest rates on loans extended to medium and small fishery operators. (2) Relaxing fishing vessel loan requirements. (3) Creating an agency to handle financial adjustments for fishery operators terminating operations due to bankruptcy or business depression, and to facilitate fleet reduction through cancellation of vessel licenses issued to operators withdrawing from the fishery, thereby promoting consolidation of the tuna fishing industry. (Suisan Keizai Shimbun, July 30, 1965.)

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#### TUNA FISHERMEN'S FEDERATION STUDIES MEASURES TO OVERCOME DEPRESSED ECONOMIC CONDITION:

The Japanese Government and tuna industry have been holding a series of meetings to develop measures to stabilize and strengthen the industry. At the joint meeting July 29, 1965, a proposal was made by the vice president of the National Federation of Tuna Fish-



Japan (Contd.):

ermen's Cooperative Associations (NIKKAT-SUREN) that in order to cope with the deteriorating economic condition and to strengthen the competitive international position of Japan's tuna fishery, immediate consideration be given to the establishment of a corporation to handle financial adjustments for tuna vessel owners withdrawing from the fishery due to bankruptcy or business depression and facilitate fleet reduction through cancellation of their vessel licenses. Details as to type, form, and function of the proposed organization were not disclosed, but on August 16 that organization was thoroughly studying problems involving implementation of the proposal.

At the August 5 meeting of NIKKATSUREN's policy committee it was proposed that this year (1965) some Atlantic-caught albacore tuna be diverted to the U. S. west coast to avoid oversupplying Puerto Rico, thereby depressing prices. This reportedly occurred in 1964 when over 30,000 tons of albacore were delivered to that Island. The policy committee feels that of the estimated annual total Atlantic Japanese albacore catch of 40,000 tons, 30,000 tons would be a reasonable quantity to ship to Puerto Rico and about 10,000 tons can be diverted to U. S. west coast packers. The additional freight cost of US\$10-20 a ton for shipping the tuna to the U.S. west coast would be borne by vessel owners, cold-storage operators, and exporters. Albacore tuna landings in excess of 40,000 tons would be shipped to Japan and packed in oil for sale on the Japanese domestic market. (Suisancho Nippo, August 18; Suisan Tsushin, August 19, 1965.)

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#### NEW ORGANIZATION TO REPRESENT COASTAL TUNA FISHERMEN:

Japanese tuna fishermen engaged in the tuna fishery off Japan, on July 27, 1965, organized a group called the "Near Seas (Off-shore) Tuna Fishermen's Council." In 1964 the Fisheries Agency had established the "Near Seas Tuna Fishery" as a licensed fishery (north of 10° N. latitude and west of 160° E. longitude), limiting the number of vessels that could engage in that fishery to 1,850 vessels ranging in size between 20-50 gross tons. The Council, under the sponsorship of the National Federation of Fishermen's Cooperative Associations, was organized to

represent fishermen engaged in that fishery. (Suisancho Nippo, July 28, 1965.)

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#### TUNA WAGE AGREEMENT SIGNED BY BOAT OWNERS AND CREW MEMBERS:

The Tunaboat Owners Association of Northern Miyagi, on August 11, 1965, met with representatives of crew members sailing on the Association's vessels and signed a wage agreement calling for the payment to crew members of fixed monthly wages. Formerly, crew members were paid on a share basis. Under the new wage contract, their income will now consist primarily of salary, plus other benefits, such as trip allowance and bonus to encourage production.

The wage agreement provides for the payment of the following monthly fixed wages: fishing captain 31,250 yen (US\$87); vessel captain 22,500 yen (\$63); chief engineer 26,250 yen (\$73); chief radio operator 22,500 yen (\$63); deck chief 19,500 yen (\$54); engine-room crew member 16,250 yen (\$45); and deckhand 15,000 yen (\$42). Including allowances and bonuses, a fishing captain is expected to receive per month a total sum of about 50,000 yen (\$139) and a deckhand about 23,000 yen (\$64). (Suisan Keizai Shimbun, August 20, 1965.)

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#### CANNING FIRM GRANTED PATENT FOR NEW TUNA PACK:

A Japanese canning firm in Urahara-machi, Shizuoka Prefecture, was granted a patent (No. 3812714) July 8, 1965, by the Japanese Government for a special canned tuna pack described as "tuna dressing pack." The firm originally filed a patent application October 14, 1960, but the issuance of patent rights was delayed due to objections filed by other firms that the process was already known to the industry. (Kanzume Nippo, August 7, 1965.)

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#### MARKET VALUE OF TUNA FISHING LICENSES:

Tuna fishing licenses in Japan, which are freely sold on the open market at a premium, are reported to have declined in value to 130,000-140,000 yen (US\$361-389) a vessel (gross) ton, compared with close to 400,000 yen (\$1,111) offered per ton 3 or 4 years ago. The decline in market value is attributed to

## Japan (Contd.):

depressed conditions in the tuna fishery caused by a decline in catch, longer trips, and growing labor costs. (Suisan Keizai Shimbun, July 21, 1965.)

Note: See Commercial Fisheries Review, Nov. 1964 p. 90, and Sept. 1964 p. 73.

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# SALMON MOTHERSHIP FISHING IN NORTH PACIFIC AND BERING SEA ENDS:

The first (Kyokusan Maru, 10,757 gross tons) of the 11 Japanese salmon motherhips operating in the North Pacific and Bering Sea reached its catch target on July 22, 1965. The remaining 10 motherhips were expected to reach their targets by July 26 and to return to Hakodate, Japan, in early August. (Suisan Tsushin, July 24, 1965.)

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# KING CRAB PRODUCTION IN BRISTOL BAY AS OF JULY 20, 1965:

The Japanese Canned Crab Sales Company reported that the Japanese pack of canned king crab in the Bristol Bay area through July 20, 1965, totaled 140,387 cases (48  $\frac{1}{2}$ -lb. cans). Of that total, 70,995 cases were packed by the factoryship Tainichi Maru and 69,392 cases by the Tokei Maru. The combined 1965 pack target of those vessels in Bristol Bay was previously reported as 185,000 cases of king crab. (United States Embassy, Tokyo, July 29, 1965, and other sources.)

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# KING CRAB FACTORYSHIPS IN EASTERN BERING SEA TO REACH TARGET IN MID-AUGUST:

The two Japanese king crab factoryships (Tainichi Maru, 5,859 gross tons, and Tokei Maru, 5,385 gross tons) operating in the eastern Bering Sea, were expected to reach their combined production target of 185,000 cases (48  $\frac{1}{2}$ -lb. cans) in mid-August. As of July 21, their production totaled 141,741 cases, equal to 77 percent of the target. (Suisan Tsushin, July 24, 1965.)

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# LIMITATIONS ON GULF OF ALASKA TRAWLING:

The Japanese Fisheries Agency licensed 11 trawl fleets to conduct commercial opera-

tions in the Gulf of Alaska in 1965 subject to the following limitations.

(1) Trawling for halibut, salmon, and king crab is prohibited. These species, if incidentally caught with other species of fish, shall be immediately returned to the sea.

(2) The catch of herring measuring less than 22 centimeters (8.7 inches) in body length (fork length) shall not exceed 10 percent of the total catch of herring. If that limit is exceeded, fishing operations shall be immediately suspended and shifted to other fishing grounds.

(3) No fishery, including the taking of sea animals and seaweed, shall be conducted in the sea area within 3 miles from the lowest tide mark of a foreign territory.

(4) Carrying long lines and gill nets aboard any trawler is prohibited.

(5) The daily catch of each trawling fleet shall be reported to the Japanese Government fishery inspector.

(6) In the following prescribed areas, between July 1 and October 31, fishing operations shall be avoided in the vicinity of United States crab pots or other fixed gear:

(a) The sea area bounded by a line starting from a point at 57°15' N. lat., 154°51' W. long., thence to a point at 56°57' N. lat., 154°34' W. long., thence to a point at 56°21' N. lat., 155°40' W. long., thence to a point at 56°26' N. lat., 155°55' W. long., and thence to the point of origin.

(b) The sea area bounded by a line starting from a point at 56°27' N. lat., 154°06' W. long., thence to a point at 55°46' N. lat., 155°27' W. long., thence to a point at 55°40' N. lat., 155°17' W. long., thence to a point at 55°48' N. lat., 155°00' W. long., thence to a point at 55°54' N. lat., 154°55' W. long., thence to a point at 56°03' N. lat., 154°36' W. long., thence to a point at 56°03' N. lat., 153°45' W. long., thence to a point at 56°30' N. lat., 153°45' W. long., thence to a point at 56°30' N. lat., 153°49' W. long., and thence to the point of origin.

(c) The sea area bounded by a line starting from a point at 56°30' N. lat., 153°49' W. long., thence to a point at 56°30' N. lat., 153°00' W. long., thence to a point at 56°44' N. lat., 153°00' W. long., thence to a point at 56°57' N. lat., 153°15' W. long., thence to a point at 56°45' N. lat., 153°45' W. long., and thence to the point of origin.

(d) The sea area bounded by a line starting from a point at 57°05' N. lat., 152°52' W. long., thence to a point at 56°54' N. lat., 152°52' W. long., thence to a point at 56°46' N. lat., 152°37' W. long., thence to a point at 56°46' N. lat., 152°20' W. long., thence to a point at 57°19' N. lat., 152°20' W. long., and thence to the point of origin.

(e) The sea area bounded by a line starting from a point at 57°35' N. lat., 152°03' W. long., thence to a point at 57°11' N. lat., 151°14' W. long., thence to a point at 57°19' N. lat., 150°57' W. long., thence to a point at 57°48' N. lat., 152°00' W. long., and thence to the point of origin.

(f) The sea area bounded by a line starting from a point at 58°00' N. lat., 152°00' W. long., thence to a

## Japan (Contd.):

point at 58°00' N. lat., 150°00' W. long., thence to a point at 58°12' N. lat., 150°00' W. long., thence to a point at 58°19' N. lat., 151°29' W. long., and thence to the point of origin. (Fisheries Attache, United States Embassy, Tokyo, July 21, 1965.)

Note: See Commercial Fisheries Review, Aug. 1965 p. 79, Feb. 1965 p. 51, Jan. 1965 p. 26.

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#### FIRMS TO BUY ALASKA POLLOCK FROM U.S.S.R.:

Several major Japanese fishing companies are developing plans (strongly opposed by the coastal fishermen and processors of Hokkaido) to send their factoryships to the Okhotsk Sea in winter 1965/66 to buy Alaska pollock from Soviet trawlers, primarily for processing into fish meal. They are reported to have submitted to the Fisheries Agency applications to purchase from the Soviet Union a total of 180,000 metric tons of fresh Alaska pollock.

In January-March 1965, a Japanese firm engaged in the first venture of this type with the Soviet Union. In that operation, that firm's 14,000-ton factoryship Hoyo Maru processed into fish meal 36,300 metric tons of fish delivered by Soviet trawlers. (Suisan Tsushin, July 24; Suisancho Nippo, July 26, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 82, May 1965 p. 76, March 1965 p. 83.

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#### CANNED SHRIMP SUPPLIES FOR EXPORT AT RECORD LOW:

There were no Japanese exports of canned shrimp in May-June 1965 due to the extremely light supplies available from the 1965 pack, and also because the 1964 pack has been completely sold out. In April 1965, canned shrimp exports totaled only 621 cases (24 ½-lb. cans), having dropped from 11,032 cases in March.

In May-June 1964, Japan exported 141,616 cases of canned shrimp. Of that total, 30,053 cases went to the United States, 98,024 cases to the United Kingdom, 11,020 cases to Canada, and the remainder to other countries. (Fisheries Attache, United States Embassy, Tokyo, August 4, 1965.)

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#### SWORDFISH EXPORT APPROVALS TO THE U. S. AND CANADA, APRIL-MAY 1965:

Japanese export approvals of frozen broadbill swordfish to the United States and Canada

in April-May 1965 totaled 563.6 short tons valued at US\$372,149, as compared to 365.0 tons valued at \$192,950 in April-May 1964.

The frozen swordfish export validations in April-May 1965 included 385.3 tons of fillets valued at \$244,993; 60.3 tons of chunks valued at \$48,629; and 118.0 tons of other swordfish valued at \$78,527. In April-May 1964, frozen swordfish export validations included 280.7 tons of fillets valued at \$139,161; 71.3 tons of chunks valued at \$47,079; and 13.0 tons of other swordfish valued at \$6,710. (Fisheries Attache, United States Embassy, Tokyo, August 12, 1965.)

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#### CANNED SAURY EXPORTS FOR 1965:

Data from the Japan Saury Sales Company reveal that canned saury consigned for export during the business year 1965 (beginning August 1964) totaled 506,000 cases and stocks were completely sold by June 30, 1965. Compared to the previous business year, exports were down by about 450,000 cases. The sharp decline in exports was due to greatly reduced stocks resulting from the extremely poor saury season, which begins in the fall. The 1964 catch of saury totaled about 200,000 metric tons, down 46 percent from the 380,000 tons in 1963.

Principal countries that bought canned saury in business year 1965 were: New Guinea 206,020 cases; Ceylon 158,000 cases; Burma 42,300 cases; Malaysia 34,165 cases; and the Philippine Republic 13,813 cases. In business year 1964, the Philippine Republic (416,985 cases) and New Guinea (221,665 cases) were the largest importers of canned saury. (Kanzume Nippo, July 21, 1965, and other sources.)

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#### NORTH PACIFIC AND BERING SEA WHALING TRENDS, 1965:

Japan's catch of whales through July 3, 1965, by three whaling fleets operating in the North Pacific and Bering Sea totaled 484.99 blue-whale units of baleen whales and 959 sperm whales. That catch yielded 6,430 metric tons of baleen oil and 7,131 tons of sperm oil. During the same period in 1964, the three fleets caught 540.66 blue-whale units of baleen whales and 605 sperm whales for a production of 7,526 tons of baleen oil and 4,678 tons of sperm oil.

## Japan (Contd.):



Fig. 1 - Stern view of Japanese whale factoryship with stern ramp for retrieving dead whales for processing.



Fig. 2 - Flensing sperm whale aboard a Japanese factoryship in the North Pacific.

In 1964 all three fleets concentrated on catching both baleen and sperm whales. But in 1965 only one fleet concentrated on both species of whales. Efforts of the other two fleets were divided between baleen and sperm whales, one for baleen whales only and the other fleet hunted sperm whales. The pattern of fishing effort in 1965 as compared with 1964 may account for the difference in catch by species between the two years. (Fisheries Attache, United States Embassy, Tokyo, August 3, 1965.)

Note: See Commercial Fisheries Review, Aug. 1965 p. 86; July 1965 p. 78; May 1965 p. 80.

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#### WHALE CATCH FROM COASTAL AREAS, 1965:

Japanese coastal whalers during the season through July 7 landed 343 sei whales, 3 humpback, and 129 sperm whales as compared with a catch of 4 blue whales, 10 finback, 500 sei and 177 sperm whales during about the

same period in 1964. (Fisheries Attache, United States Embassy, Tokyo, August 3, 1965.)

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#### WHALING IN NORTH PACIFIC-BERING SEA:

The three Japanese whaling fleets operating in the North Pacific and Bering Sea had harvested, as of July 25, 1965, a total of 3,657 whales, consisting of 1,517 sperm whales, 1,143 sei whales, 917 fin whales, 41 blue whales, and 39 humpback whales. (Suisan Tsushin, July 27, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 78, and Aug. 1965 p. 86.

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#### BERING SEA FISHING TRENDS AND WHALING:

As of August 18, 1965, the fish meal factoryship Hoyo Maru (14,094 gross tons) operating in the eastern Bering Sea caught 72,000 metric tons of fish and produced 11,200 tons of fish meal, 2,450 tons of fish solubles, 1,100 tons of fish oil, and 3,900 tons of frozen products.

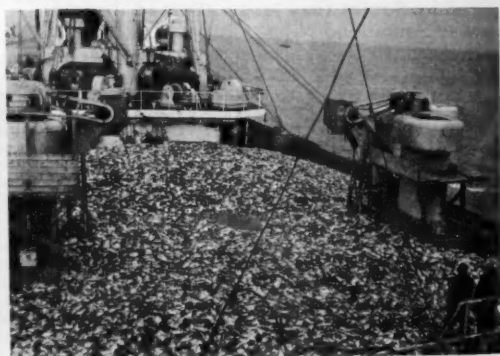


Fig. 1 - Fish on afterdeck of Japanese factoryship Gyokuei Maru.

The fish meal factoryship Gyokuei Maru (10,357 gross tons), also in the eastern Bering Sea, as of August 17 caught 83,500 metric tons of fish and produced 13,000 tons of fish meal, 2,750 tons of fish solubles, 1,050 tons of oil, and 3,250 tons of frozen products.

The Hoyo Maru and Gyokuei Maru were scheduled to terminate operations around September 20 and were expected to exceed their targets, (Suisan Tsushin, August 20, 1965.)



## Japan (Contd.):



Fig. 2 - Japanese factoryship Tenyo Maru with fishing trawler alongside.

A large Japanese fishing company has been studying plans to dispatch the 11,500-ton factoryship Tenyo Maru to the Bering Sea for the 1965/1966 winter season, but the firm encountered some difficulty in signing up trawlers in the 200- to 300-ton class to fish for the factoryship. (Shin Suisan Shimbun Sokuho, August 20, 1965.)



Fig. 3 - Japanese factoryship Chichibu Maru.

The Japanese factoryship Chichibu Maru (7,422 gross tons) was scheduled to depart Hakodate, Japan, for the Bering Sea around August 30. Accompanied by 8 trawlers in the 260-ton class, she was scheduled to remain on the fishing grounds for about 44 days. (Suisan Tsushin, August 19, 1965.)

The 7,000-ton refrigerated carrier vessel Kashima Maru departed Kobe, Japan, for the whaling base at South Georgia Island on August 18, 1965. Ten whale catcher vessels and the 13,000-ton tanker Matsushima Maru

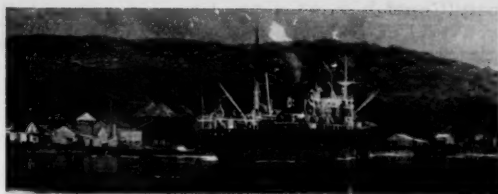


Fig. 4 - Japanese freezer-factoryship at a harbor in South Georgia Island.

were to join the Kashima Maru at the South Georgia base in the Antarctic. Production target of the fleet is 170 blue-whale units, plus 40 sperm whales. (Minato Shimbun, August 19, 1965.)

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#### JOINT JAPANESE-NORWEGIAN WHALING VENTURE:

The Japanese Fishery Agency has accepted and is expected to approve a contract between a large Japanese fishing company and a Norwegian whaling firm, according to the periodical Nihon Keizai Shimbun, August 17, 1965. The contract provides that five catcher vessels owned by the Japanese firm are to be sold to the Norwegians and that Japanese crews will operate the vessels. The Japanese firm will purchase 7,000 metric tons of whale meat from the Norwegians.

The periodical pointed out that the contract did not appear to be a lucrative one for the Japanese, but it would allow the Japanese firm to satisfy its whale meat requirements while eliminating surplus vessels and providing continuous employment for catcher vessel crews (Fisheries Attache, United States Embassy Tokyo, August 19, 1965.)

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#### FISH OIL PRODUCTION, 1960-1964:

Japanese production of fish-body oil in 1964 totaled 18,300 metric tons according to data from the Japan Aquatic Oil Association. (Editor's Note: That total is larger than previous reports indicated because the earlier data did not include oil from North Pacific and Bering Sea operations.) The 1964 production of fish-body oil was down 12 percent from 1963 due mainly to a sharp drop in production of saury oil.

Japanese production of fish-liver oil in 1964 totaled 8,700 tons. That was a gain of

## Japan (Contd.):

Japan's Production of Fish-Body Oil, Liver Oil, and Squid Oil, 1960-1964					
Type of Oil	1964	1963	1962	1961	1960
	..... (1,000 Metric Tons) .....				
<b>Fish-Body Oil:</b>					
Saury . . . . .	2.8	7.7	18.9	11.0	7.0
Mackerel . . . . .	0.8	2.0	3.2	0.4	0.6
Atka mackerel . . . . .	1.8	0.9	0.7	2.4	0.6
Sand lance . . . . .	0.1	0.4	0.7	1.1	1.0
Sardine . . . . .	0.3	0.6	0.8	0.9	0.6
Flatfish <sup>1</sup> . . . . .	7.4	5.9	8.8	8.0	5.3
Other fish-body oils . . . . .	5.1	3.4	4.2	6.1	5.0
Total fish-body oil . . . . .	18.3	20.9	37.3	29.9	20.1
<b>Fish-Liver Oil:</b>					
Alaska Pollock . . . . .	7.5	6.0	7.8	6.7	6.2
Shark . . . . .	1.0	1.3	2.2	2.2	3.8
Other fish-liver oils . . . . .	0.2	0.2	0.7	1.7	1.1
Total fish-liver oils . . . . .	8.7	7.5	10.7	10.6	11.1
<b>Squid Oil . . . . .</b>	1.0	2.7	3.2	3.0	2.7
<b>Grand Total . . . . .</b>	<b>28.0</b>	<b>31.1</b>	<b>51.2</b>	<b>43.5</b>	<b>33.9</b>

<sup>1</sup>/Includes oil from North Pacific and Bering Sea operations.

15 percent over the previous year due to greater production from Alaska pollock. Japanese output of shark-liver oil continued to decline in 1964. Squid oil production was also down. (Fisheries Attache, United States Embassy, Tokyo, August 24, 1965.)

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#### MORE LARGE TRAWLERS TO BE LICENSED TO FISH IN ATLANTIC AND SOUTH PACIFIC:

In July 1963 the Japanese Government approved the licensing of a total of 48 standard (50- to 300-ton class) vessels (in addition to the 30-odd large stern trawlers already in operation) to engage in the Atlantic Ocean and South Pacific distant-water trawl fishery. It was decided at that time that after a sufficient interval had elapsed the licensing of additional trawlers would be considered. On July 26 the Central Fisheries Coordination Council (highest Government-industry advisory group) for the second time in two months reviewed and adopted the Fisheries Agency's recommendations to license additional vessels for the distant-water trawl fishery. The Agency's recommendation was based on the conclusion that the exploitation of unutilized bottomfish resources is essential in assisting the depressed offshore trawl, purse-seine, and tuna long-line fisheries, particularly in view of the spectacular advances being made in the trawl fisheries of other foreign nations.

The Agency recommended that: (1) 22 additional vessels over 500 gross tons in capacity be licensed to engage in the distant-water trawl fishery; (2) operational areas be extended be-

yond the existing areas designated for the distant-water trawl fishery; and (3) licenses to engage in distant-water trawling also be granted to operators of purse-seine vessels and tuna long-liners, including portable-boat-carrying motherships that wish to switch to trawling. Previously, licenses were issued only to owners of vessels engaged in other trawl fisheries.

Concerning proposal (1), the Agency recommended that in licensing the 22 vessels consideration should be given to the condition of fishery resources in the area of operation, as well as conditions of the fishery from which the vessel owner desires to withdraw and adjustments that will be required to make the change. Sizes of vessels to be newly licensed will be grouped into three tonnage categories, i.e., over 500 but under 550 tons, over 550 but under 1,000 tons, and over 1,000 tons.

Proposal (2) called for expanding the operational area of the distant-water trawl fishery to include all ocean areas except the waters north of 10° N. latitude in the Pacific Ocean, the waters north of 40° N. latitude in the Atlantic Ocean, the Mediterranean Sea east of 5°30' E. longitude, the Gulf of Aden west of 50° E. longitude, and the Red Sea. Thus, under this change, the trawl fisheries in the Indian Ocean, Atlantic Ocean south of 40° N. latitude, and Pacific Ocean south of 10° N. latitude will henceforth be regulated as one fishery.

Under proposal (3), in case the number of license applications exceeds the officially announced 22 vessels, priority in granting licenses will be as follows, based on provisions to be separately prescribed: (1) preference be given on basis of vessel tonnage withdrawn from the offshore trawl fishery, Isei (East China Sea) trawl fishery, large- and medium-size purse-seine fishery, and distant-water tuna fishery, including portable-boat-carrying mothership-type fishery; and (2) in the case of newly built vessels, priority will be given only to vessels with crew quarters built in conformity to the standard prescribed for distant-water trawlers. Licensing of existing vessels will be based on the condition that in case of their replacement by new vessels, the replacement vessels will contain crew quarters built to prescribed specifications. Applicants who already own several distant-water trawlers (over 10 percent of total licensed vessel tonnage) will be placed below others on the priority list. Also, operators of large and medium purse seiners in the western Japan Sea area who withdraw vessels

## Japan (Contd.):

over 100 gross tons in capacity will be given preferential treatment.

In connection with the new licensing policy on distant-water trawling, the Fisheries Agency has clarified its views on the condition of the bottomfish resources off the African coast in the Atlantic Ocean, as follows:

At the present time, the operation of Japanese trawlers in the Atlantic Ocean off Africa is confined to certain areas somewhat different from those fished by trawlers of other foreign countries, and there still remain considerable areas that can be exploited. In the future as the fishing grounds are expanded, the composition of the catch will change and this will require planning for the development of new markets.

The grounds off northwest Africa are the main fishing grounds for sea bream, squid, and octopus, which are now being transshipped to Japan. The fishery is profitable but prospects do not appear bright for developing a fishery for those species in other areas. On the other hand, the catch of other species, such as mackerel, is increasing. They were formerly discarded but they have come to have commercial value through improvements made in processing techniques and through the development of new markets, and hope is held for the future development of a fishery for those species.

The southern fishing grounds are highly productive and the topography of the sea bottom is such that the resources are well protected from fishing pressure. Thus, it is believed that fishing effort can be substantially increased without endangering the resources. It is not possible to speculate on the present or future condition of the resources due to the short history of the fishery and to the inadequacy of data but it is believed that on the whole there is further room for exploitation.

In some cases, catch per unit of effort for certain species has decreased slightly and the size of the fish in the catch has become smaller. These are considered characteristic features of a virgin resource under exploitation. After a while the catch will tend to stabilize at a lower level. However, it is necessary to continue to observe these developments by carefully studying them in the future. (Suisan

Keizai Shimbun, July 27 & 29; Suisancho Nippo, July 27, 1965, and other sources.)

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**NEW STERN TRAWLER DELIVERED:**

A Japanese fishing company on July 22, 1965, took delivery of the new stern trawler Tokachi Maru (2,530 gross tons). The trawler was scheduled to depart Japan August 2 for the Gulf of Alaska under charter to another Japanese fishing company. (Suisan Tsushin, July 23, 1965.)

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**RESTRICTIONS LIFTED ON FISHING VESSEL EXPORTS TO SOUTH KOREA:**

The Japanese Government was scheduled on July 30, 1965, to formally eliminate the restrictions placed on Japanese fishing vessel exports to the Republic of South Korea. The restrictions, which were imposed in 1953 as a retaliatory measure against South Korea following the establishment of the Rhee Line, prohibited the exportation to that country of Japanese fishing vessels other than wooden vessels over 5 years old. One exception to this decree was made in early 1965 when the export of 11 new 145-ton tuna fishing vessels (exported as "refrigerated vessels") was permitted to expedite the negotiations between Japan and South Korea to normalize relations. During the negotiations the Japanese Government had agreed to favorably reconsider its 1953 decision should the talks (agreement concluded June 1965) be satisfactorily concluded. (Suisan Keizai Shimbun, July 30, 1965.)

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**GOVERNMENT ADOPTS EXPORT TARGET AND PROMOTION MEASURES:**

The Supreme Export Council of Japan met on August 16, 1965, to discuss export targets for fiscal year 1965 (April 1965-March 1966) and measures to promote their attainment. The Council officially adopted the 1965 export target of US\$8,530 million (actual FY 1964 exports were \$7,187 million), based on export validations. The export target for agricultural and fishery products was set at \$514.7 million, or about 6 percent of the national export target. Included is \$168.9 million for canned food products (including canned fish), \$172.8 million for fishery products (other than canned), and \$22.8 million for oils and fats. Actual exports in 1964 for canned food products

## Japan (Contd.):

totalled \$167.3 million, fishery products \$153.5 million, and oils and fats \$28.7 million.

To promote exports of marine products, the Council adopted resolutions to: (1) give special consideration to financial transactions entered into by the Sales Companies (e.g., better terms for letters of credit issued by the Companies); (2) relax terms of payment for the construction of fishing vessels for the domestic fishery (e.g., extending same loan terms as those granted for the construction of fishing vessels for export to foreign countries); (3) broaden the special tax measures implemented in fiscal year 1964 to promote exports but which have been found not fully effective, strengthen the base of enterprises engaged in export, and study and implement a tax system aimed at encouraging export trade; and (4) give special consideration to the treatment of incomes derived from export transactions involving frozen fishery products and fresh tuna, which can be considered as falling within the classification of primary products, and that such incomes be treated under the special tax measures. (Suisan Keizai Shimbun, August 17, 1965.)

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#### COMMITTEE OF SPECIALISTS' VIEWS ON PROMOTING FISHERIES:

The Japan Fisheries Society, as its primary activity for business year 1965, established a committee of specialists to study ways and means of promoting Japan's international fisheries. The committee holds the view that: (1) measures to stabilize management and to increase productivity should be developed based on the concept of international cooperation so as to improve Japan's competitive position in international fisheries, and (2) the Government should extend favorable treatment to fishery operators with regard to loans and taxes. The committee, which plans to review and seek modification, if necessary, of the existing licensing system so as to permit depressed fishery operators to combine their enterprises into corporations of appropriate sizes as a means of stabilizing management, is expected to have its study completed shortly and to request the Government to establish a government-industry study group to develop plans to implement its proposals. (Suisan Keizai Shimbun, August 14, 1965.)

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#### RESEARCH VESSEL TO EXPLORE WATERS SOUTH OF AUSTRALIA:

The Japanese Fisheries Agency planned to dispatch September 1, 1965, the research vessel Suruga Maru No. 1 (339 gross tons) to the Continental Shelf waters south of Australia. The vessel is scheduled to operate about 73 days principally along the Shelf about 600 miles from shore to develop new fishing grounds. (Suisan Keizai Shimbun, August 24, 1965.)

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#### FUNDS FOR FISHERY DATA CENTER WILL NOT BE AVAILABLE BEFORE 1967:

In hopes of establishing a centralized fisheries data center for the collection, dissemination, and analysis of data to promote the rational development and use of fishery resources, the Fisheries Agency of Japan organized a committee composed of scientists from the Agency's 8 regional laboratories to formulate concrete plans on staffing, facility, and budget requirements.

The Agency had hoped to have funds allotted for the center in fiscal year 1966 (April 1966-March 1967), but in view of the Government's policy of holding manpower ceilings at the existing level the Agency felt that the program submitted by the scientific committee, which provided for a total of 31 new positions, would not be acceptable to the Government. The Agency then had its Research Division draft a modified scaled-down program, which was submitted to the scientific committee for study. The committee is said to have found the substitute plan inadequate and to have rejected it. It now appears that it will not be possible to secure funds for the center until fiscal year 1967. (Suisan Keizai Shimbun, July 26, 1965.)

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#### FISHING COMPANY RANKS 102 IN SALES IN THE WORLD:

According to the August 1965 issue of Fortune magazine, the Taiyo Fishing Company of Japan ranks 102 in sales among the world's largest business enterprises (not including United States firms) and within Japan ranks number 15 in this category. In 1964 Taiyo's sales totalled 99.9 billion yen (US\$277 million) and the sales of the 37 subsidiary companies in which that firm owns over 50 percent of the stock totalled 85.9 billion yen (\$239 million). (Suisan Tsushin, July 30, 1965.)





## Republic of Korea

### FROZEN TUNA EXPORT TARGET FOR 1965:

The South Korean Government has revised downward its tuna export target for 1965. The original target of US\$3.7 million was lowered to \$2 million inasmuch as exports up to May only totaled \$565,000. (Suisan Keizai Shim-bun, July 29, 1965.)

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### NEW TUNA VESSEL FOR TRAINING CENTER:

In August 1965, a new 142-foot fisheries training vessel named the Chin Dal Le was delivered by its Japanese builders at Shimizu to the Deep Sea Fishing Training Center at Pusan, Korea. The Training Center, which was opened in early 1965, is a joint project of the Korean Government and the United Nations Special Fund. Its purpose is to produce qualified fishermen and technicians for South Korea's expanding offshore fisheries. The project is to run 5 years with the Food and Agriculture Organization (FAO) as the executing agency.

The 300-ton Chin Dal Le will be used to train Korean fishermen in tuna long-line fishing methods. The vessel has an 800-horsepower main engine and is designed to carry 40 trainees plus a 16-man crew. It has a hold capacity for 90 to 100 metric tons of tuna, which it can freeze at a rate of 3 tons a day.

The skipper of the Chin Dal Le will be a Korean national and the chief instructor will be an FAO master fisherman from Japan. The vessel will operate around the Samoan Islands during training cruises of 3 to 4 months.

A second training vessel, a 150-ton stern trawler, for the Pusan Training Center is being built in Niigata, Japan, and is scheduled for delivery in December 1965. (Food and Agriculture Organization, Rome, August 10, 1965.)

Note: See Commercial Fisheries Review, Feb. 1965 p. 73.



## Netherlands

### NEW TYPE NET DESIGNED FOR SHRIMP TRAWLING:

A Dutch fisherman in the Province of North Holland, Netherlands, has designed a new type net for shrimp trawling. During extensive testing, this type wing trawl showed much better results than a conventional net trawled from the same vessel.

The designer refused to have the net patented by commercial net manufacturers because he wants "all fishermen to benefit." He has asked the Netherlands Fisheries Research Institute to patent the net and to make the design available to all net manufacturers.

The principle of the new net is based on the shrimp's habit of rising or jumping from the seabed when disturbed. It has two bags, the upper one (garnalenaatje) with a mesh size suitable for shrimp and the lower one (visaasje) with wider mesh. Undisturbed entry is allowed into the lower bag while the upper one has a flapper (garnalentrechter) across its mouth.

During trawling the leads disturb the shrimp; they rise from the seabed through the mesh across the mouth of the upper bag and thus into the bag. Nearly all flatfish, sea plants, and other unwanted matter are swept along the underside of the flapper and out through the end of the lower bag. The tests have shown that practically no shrimp escape through the lower bag.

Undersized shrimp that enter the upper bag pass through the mesh of the bag undisturbed. In a conventional net without the flapper, the mesh of the bag is often clogged by fish, plants, and other matter, causing a considerable loss of undersized shrimp and fish. The mesh of the flapper is so small that few undersized flatfish can enter the upper bag. If large quantities of flatfish are available, the mouth of the lower bag can be closed. By doing this, two practically completely separated catches of shrimp and fish can be made in the same trawl at the same time.

A considerable amount of undersized flatfish can be saved yearly if this type trawl is in general use. According to conservative estimates of the Institute Scientist, Dutch shrimp fishermen seriously injured about 1,000 million undersized plaice caught in

## Netherlands (Contd.):

their nets in 1964. About 155 million sole hatched in 1963 were destroyed by shrimp fishermen in the North Sea from August 1 to December 1 of that year. At the same time great numbers of undersized shrimp that could not get through the clogged mesh of the older nets will be saved. This improves the chances of better catches at later dates.

A considerable amount of labor will also be saved by the new net. Most of the Dutch shrimp vessels carry a crew of only two. With the trawls now in use they spend hours sorting the shrimp from the huge quantities of unwanted matter scooped into the nets.

With the new shrimp trawl, fishing could also become more economical. Because of mesh clogging, the vessels have been unable to trawl against the current. More than 28 percent less undersized shrimp used as chicken feed was caught in the new net than in the older one during the tests. At the same time up to 25 percent more shrimp for human consumption were caught in the new net during simultaneous trawls from the same vessel. (*The South African Shipping News and Fishing Industry Review*, March 1965.)



## New Zealand

## TUNA EXPLORATIONS ON EAST COAST SHOW PROMISE:

In early April 1965, about a ton of tuna (albacore and skipjack) was caught in one gill-net haul by the exploratory vessel *Akina*, which was under charter to the New Zealand Marine Department. A Marine Department scientist aboard the *Akina* while it was investigating the tuna potential in the Gisborne area said there was plenty of tuna off the New Zealand east coast. He said that tuna fishing with gill nets and trolling lines off Gisborne should be successful, but that a great deal of time and effort could be saved if initial studies on salinity and temperature were made before commercial fishing began.

Schools of tuna were also located in the Cape Runaway area by the exploratory vessel *Sea Star* before the vessel was accidentally beached. (New Zealand *Commercial Fishing*, May 1965.)

Note: See *Commercial Fisheries Review*, June 1965 p. 66.

## Norway

## COD FISHERY AS OF JUNE 19, 1965:

At the close of the Finmark cod season on June 19, Norwegian young and spawning cod landings in 1965 totaled 83,411 metric tons, of which 30,947 tons were sold for filleting, 29,557 tons for drying, 13,265 tons for salting, and 9,642 tons for marketing as iced fish.

The cod catch in the same period of 1964 totaled about 66,647 tons, of which 14,920 tons were sold for filleting, 26,957 tons for drying, 18,019 tons for salting, and 6,751 tons for marketing as iced fish.

In early June 1965, the Finmark fishery for young cod off northern Norway was still yielding good results. Norway's Lofoten fishery for spawning cod ended earlier with a disappointing catch of only about 19,500 tons, or a decline of 4,100 tons from the 23,600 tons taken off Lofoten during the 1964 season. (*Fiskets Gang*, No. 24, June 17, and No. 25, June 24, 1965.)

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## NORTH SEA HERRING

## FISHERY TRENDS AS OF JULY 1965:

Norway produced 200,000 metric tons of herring meal and almost 100,000 tons of herring oil from its North Sea herring fishery in the first 6 months of 1965. Herring fishing was still very good at mid-year. In June 1965 Norwegian fishermen caught more than 93,000 tons of herring in the North Sea and in July the catch totaled 149,000 tons. In addition, the herring catch off the coast of North Norway amounted to about 56,000 tons.

All Norwegian reduction plants were working at top capacity into August and fish meal and oil demand on the world market was reported difficult to meet. Contracts are being signed for deliveries far into 1966.

Note: See *Commercial Fisheries Review*, Sept. 1965 p. 73.

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## HERRING OIL PRODUCTION

## MAY REACH 100,000 TONS IN 1965:

Record catches of herring in the North Sea have resulted in a production of about 75,000 metric tons of herring oil in Norway during January-July 1965, or about 30,000 tons more than during the same period of 1964. Production during the remainder of the year may bring total 1965 production close to the 1956 record of 103,000 tons. Virtually all of the

## Norway (Contd.):

Norwegian herring oil is used in the domestic fat-hardening industry. (United States Embassy, Oslo, August 16, 1965.)

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#### WHALING RECOMMENDATIONS FOR 1965/66 ANTARCTIC SEASON:

A conference of active whaling nations (Japan, Norway, and the U.S.S.R.) was scheduled to convene in Tokyo, September 1, 1965. During preparations for the meeting, a Norwegian delegate said that Norway would support division of the 1965/66 Antarctic quota of 4,500 blue-whale units on the same basis as last season. That would give Japan 52 percent, Norway 28 percent, and the Soviet Union 20 percent of the quota. Newspapers in Oslo reported that the Norwegian delegation to Tokyo would again argue for implementation of the International Observers Scheme.

Preparations for the Tokyo meeting come at a time when international organizations were being urged to bring about a drastic reduction in the whale catch in order to avoid annihilation of world stocks. On August 20, 1965, at a meeting in Geilo of the Norwegian Oceanographic Research Society, one of Norway's leading marine biologists argued that no blue whales should be killed until the present stock has replenished itself. He said that only 4,000 fin whales and 3,000 sei whales should be taken annually. If the whaling nations are not able to agree to such a reduction, he said the Food and Agriculture Organization should intervene. (United States Embassy, Oslo, August 26, 1965.)

Only 2 Norwegian pelagic whaling expeditions are to participate in the 1965/66 Antarctic season as compared with 4 expeditions in the 1964/65 season, according to an earlier Oslo press report. The Norwegian factoryships are the *Thorshavet* and the *Kosmos IV*. The reduction in the number of whaling expeditions affects about 800 persons who will have to find other employment.

Norway's Journal of Commerce and Shipping reported on July 19, 1965, that not more than 5 Japanese expeditions will participate in the 1965/66 Antarctic whaling season as compared with 7 the previous season. Also, it was believed that the Soviets would probably not send out all 4 of their factoryships. (United States Embassy, Oslo, August 1, 1965.)



## Pakistan

### SHRIMP INDUSTRY POTENTIAL:

Pakistan needs approximately 48 additional trawlers to increase its shrimp production from 3,400 metric tons to 4,590 tons, the target called for in Pakistan's Third Five-Year Plan. The Third Plan, which began July 1, 1965, calls for a 30-percent increase in fish and shrimp production. Demand for shrimp and fish in West Pakistan is primarily for export.

The investment Advisory Center of Pakistan has prepared a study showing several business opportunities based on the West Pakistan shrimp industry. The study covers in detail the cost and operation of shrimp trawlers and indicates a wide variety of supporting opportunities including radio communications, use of spotter planes, and motherships. (International Commerce, August 23, 1965, U. S. Department of Commerce.)

Note: Additional information and a copy of the report titled "Facts and Possible Opportunities in the West Pakistan Shrimp Industry" can be obtained from: Investment Advisory Center of Pakistan, Farid Chambers, Victory Rd., Karachi, Pakistan.



## Panama

### FISHERY TRENDS, 1964 AND EARLY 1965:

Fish Reduction Industry: The only significant new development in Panama's fisheries during 1964 and early 1965 has been in the fish-reduction (fish meal) industry. Although only one fish meal plant was in operation in Panama as of early summer 1965, a second plant was under construction and there is interest by the Government and private industry to further develop this industry. Most informed sources agree, however, that the expansion of a fish meal industry in Panama will be severely limited by the availability of suitable fish (anchoveta and thread herring), and that the licensing of new plants must be carefully regulated to prevent overfishing. Im



Fig. 1 - Fish meal plant at Puerto Caimito near La Chorrera.

## Panama (Contd.):

any case, it is expected that Panama's fish meal industry will grow at a much slower pace than it has on the rest of the west coast of South America and that additional investment will depend on the success of its two plants.



Fig. 2 - Repairing purse seine at Puerto Caimito fish meal plant.

The plant already in operation is located at Puerto Caimito, 18 miles west of Panama City. It was established in late 1963 to take over the assets and liabilities of the then operating plant. Ownership is equally divided between local and United States interests and the plant is operated by a local management consulting firm. The present facility is able to process 10 to 12 tons of fish an hour. However, equipment is on hand to install a new line to double present processing capacity, bringing ultimate capacity to about 20 tons an hour. While some of the equipment is antiquated, the plant is being refurbished and new equipment is being installed, including a stick-water plant. The total investment is estimated at US\$600,000, including \$100,000 invested during the past year (1964). The plant's operation is handicapped by a lack of deep-water docking facilities, but a pier permitting the landing of approximately 6 tons of raw fish

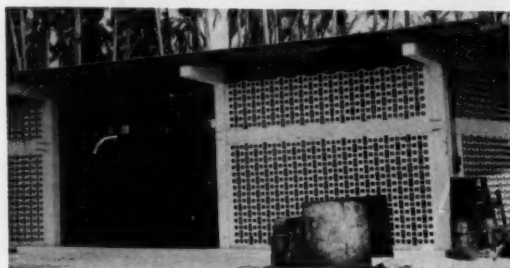


Fig. 3 - Prior to shipment, bagged fish meal is stored in this ventilated building of Puerto Caimito fish meal plant.

an hour does permit landing during most of the day. A new suction pump and line will considerably increase present capacity.

No official statistics are available on Panama's fish meal exports in 1964, but the only company presently exporting advises they have contracts in West Germany for 250 tons a month and in the United States for 200 tons a month. In addition, some sales are made to other Central American countries. The company is storing fish oil at the plant site and intends to make its first bulk shipment by barge to loading facilities in the Canal Zone in the near future.

Local Panamanian interests with past experience in the fish meal industry in Peru are building a modern new fish meal plant on Taboguilla Island several miles off the coast near Panama City. The total investment will be about \$2 million. The plant is being constructed, as a package deal, by a firm in Essen, West Germany. Their total plant investment will be about \$800,000. Financing has been obtained (5 years at 6 percent) through another firm in West Germany. The only major United States components are a stickwater plant and a burner for the cooker, which is being made in Peru. The remainder of the equipment is being supplied from European and Peruvian sources and includes a German boiler and a Norwegian centrifuge. The plant will have an initial capacity of 50 tons an hour, using 2 suction pumps and 2 processing systems. Most of the equipment, which is of advanced modern design, arrived in Panama early this summer.



Fig. 4 - Panamanian shrimp trawler *Tole* off Chiriqui coast en route to fishing banks.

The company has arranged for the purchase of 10 standard anchoveta fishing vessels from a Peruvian shipyard at a total cost of \$750,000. Reportedly, the vessels will have steel hulls and be outfitted with the latest fish-finding equipment. Delivery of 2 vessels every 3 months was scheduled to begin in the near future. Financing of the vessels has been arranged with a Peruvian bank



## Panama (Contd.):

over a five-year period. If operations warrant, the new company plans to buy fish from local vessels as well.



Fig. 5 - Shrimp vessels land at the village of Pedregal near David in Chiriqui Province.

As of early summer, buildings and related facilities were being installed at the plant site. A local construction firm was building a deep-water pier at an estimated cost of \$100,000. The facility is designed to permit loading of ships up to 10,000 deadweight tons. Catchment basins, designed to hold 2,000 tons of water, each were being built to store water for the dry season. The company hoped to have the plant in operation by August 1965 and an auxiliary fish oil plant completed by December. It was believed, however, that actual operations probably would not start until early 1966. Local costs were to be met by the Panamanian investors.

It was considered doubtful by some observers that the waters adjacent to Panama City can support more than two fish meal plants. But other informed observers believe fishing conditions would permit additional plants on the Pacific Coast south and east of Panama City. Prospects are not considered good on the Atlantic Coast. Fish

meal will be produced from anchoveta and thread herring which appear off the Panamanian coasts at different periods of the year. The local industry feels it will experience no difficulty selling its product because of the unusually high protein content (65 percent) normally associated with Panamanian fish meal.



Fig. 6 - Closeup of a Panamanian trawler docked at Panama City.

**Other Fisheries:** Panama's major fishery in 1964 centered on the processing and packaging of shrimp principally for export, with sales estimated at over \$7 million. No significant developments occurred during the year in other fisheries. Efforts to stimulate the use of Panama's abundant fish resources by the Government were continued, but with only moderate success. Government officials are particularly hopeful that local industries can be established for the canning of sardines for export and fresh fish for domestic consumption. A local supplier of fishing supplies joined with other local interests to try to encourage the sale of frozen fish in interior regions of Panama, using a refrigeration unit



Fig. 7 - Shrimp plant in Panama City. Shrimp are transported from dock by truck in special containers. Shrimp are unloaded from truck, emptied into hoppers, and carried on conveyor belts to washers and sorters.

## Panama (Contd.):

and trucks with enclosed iced beds. Meanwhile, consumer demands are met by independent fishermen, several cooperatives, and from fish caught incidental to shrimp fishing operations.

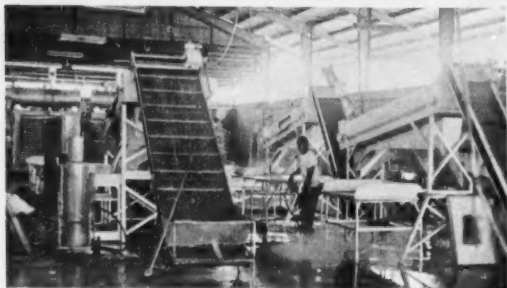


Fig. 8 - Type of shrimp sorters used by plant in Panama City.

Lobster fishing was considered poor during 1964, with catches landed mostly by small independent operators and with no large-scale production in sight. Panama's largest shrimp producer received an order for 10,000 pounds of scallops this past summer for delivery to New York City. Although the company hopes to increase its scallop business, it recognizes that Panamanian scallops generally are bought in the United States only when domestic catches are low.

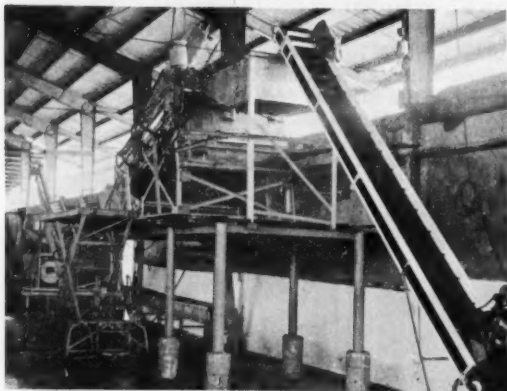


Fig. 9 - Shrimp peeling machine in Panama City plant.

**Fishing Industry Organizations:** In 1964, Panamanian fishermen established an organization called the "Asociacion Nacional de la Industria Pesquera Panameña." That Association has been active politically, principal-

ly pushing for new legislation to benefit the local shrimp industry. The Association also is concerned regarding the increased building of vessels for shrimp fishing within the Republic of Panama. It has urged legislation to limit such construction, as well as to create an effective organization for the control and conservation of the local shrimp fishery. (United States Embassy, Panama, May 1965.)

Note: See Commercial Fisheries Review, Sept. 1964 pp. 88-89.



## Poland

RESEARCH VESSEL SURVEYS  
NORTH ATLANTIC WATERS:

Poland's largest fishery research vessel, the 800-ton Wieczno, called at the Port of Halifax in May 1965 after completing a 35-day survey of fish populations off the coast of Labrador. The vessel, which is under the direction of the Polish Sea Fisheries Institute at Gdynia, was also scheduled to conduct a similar survey on Georges Bank.

In an interview, the vessel's skipper stated that in addition to the Wieczno, Poland operates 4 smaller fishery research vessels which had been working in the North Sea and Northeast Atlantic. During this past winter the Wieczno conducted research off West Africa. The data collected will be used in planning future Polish fishing efforts.

As of mid-summer 1965, Poland's 11 large stern factory trawlers were operating in the sea of Labrador. During winter 1964/65 they fished off the coast of West Africa, together with a Soviet fishing fleet. Only one Polish BMRT type vessel, the Uran, was reported on Georges Banks in 1965, but exploratory and research work by the Wieczno May indicate an increased Polish fishing effort in the waters off United States coasts.

Note: See Commercial Fisheries Review, May 1965 p. 85.

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FISHING VESSELS FOR FRENCH AND  
BRITISH FIRMS TO BE BUILT AT GDYNIA:

A French firm has concluded a contract with Poland's Gdynia Shipyards for the delivery of 7 side trawlers to be used in French fisheries for herring and groundfish. The 482-gross-ton vessels are about 150 feet long, with an operating endurance of 24 days, and a crew of 23. (Budownictwo Okretowe, Vol. 10, No. 6, 1965.)

## Poland (Contd.):

Polish Shipyards built about 15 trawlers for French owners during 1960-1962. The performance of those vessels led a British fishery firm in April 1965 to order a trawler from the Gdynia Shipyards.



## Ryukyu Islands

## WHITE PAPER ON 1964 FISHERIES:

The Economic Bureau, Ryukyuan Government, on July 19, 1965, released a white paper on the Ryukyuan fisheries for 1964. According to the white paper, 1964 saw a rapid expansion in the catch of the distant-water fishery but the catch of the coastal fishery remained static. The 1964 production totaled 22,162 metric tons, an increase of 4,623 tons (26 percent) over 1963. The distant-water tuna fishery catch totaled 5,240 tons. This was a 95-percent increase since 1961. The coastal fishery production, which has been steadily declining on the average of about 14 percent every year, increased one percent in 1964, totaling 5,323 tons. The most notable change in 1964 was the expansion in the area of operations of the distant-water tuna fishing vessels. A fleet of 25 large tuna vessels engaged in that fishery, with some vessels operating in the South Pacific and others in the Atlantic Ocean.

Production of processed fishery products showed a slight increase, totaling 3,968 metric tons. Of that quantity, 51 percent consisted of kamaboko (fish cake), 24 percent fish hams and sausages, and 23 percent katsuobushi (dried skipjack loin). Production of kamaboko and fish sausages increased and production of katsuobushi decreased (skipjack catch declined by 135 tons in 1964).

The number of people engaged in fishing totaled 10,011, an increase of 38. This is the first increase in the past nine years but it was attributed to an increase in demand for fish protein and to stabilized fish prices, as well as to the decline in farming income. Full-time fishermen totaled 5,973, a decrease of 20. By age groups, 28.3 percent were between 30-39 (largest group) and 17.6 percent between 21-29.

Exports totaled US\$2,730,000, an increase of \$230,000. Of that amount, exports of tuna

landed by Ryukyuan vessels operating from overseas bases comprised 60 percent and exports of coral 18 percent.

Imports totaled \$4,988,000, an increase of \$981,000. Of that amount, canned fish products totaled \$2,283,000, fresh fish \$794,000, and katsuobushi \$694,000. (Shin Suisan Shim-bun Sokuho, July 29, 1965.)



## South Africa Republic

## NEW SPINY LOBSTER GROUNDS IN INDIAN OCEAN FISHED BY SOVIETS AND SOUTH AFRICANS:

Recently discovered spiny lobster grounds in the Indian Ocean were described by one South African trawler captain as "absolutely fantastic, and you could never fish them out." The new fishing grounds are located some 90 miles east of the Mozambique coast and are reported to extend for about 95 miles. In early August 1965, at least nine South African trawlers were fishing for spiny lobster in that area, and many more were expected since spiny lobsters have been scarce in Cape waters.

Reports indicated that there were also at least three Soviet trawlers, accompanied by a supply ship and a small survey vessel, exploiting the new lobster grounds. The three Soviet trawlers were described as a stern trawler of at least 1,200 tons and 2 side trawlers, estimated at 700 tons each. The Soviet equipment was said to be efficient. One South African captain stated that the Soviet stern trawler captured as many rock lobsters in one haul as his vessel could "in about a week."

The South Africans were concerned over the Soviet practice of simply dumping lobster waste overboard. Scientists of the South African Division of Sea Fisheries have confirmed the harmfulness of the practice, stating that a large amount of discarded lobster waste decomposing under water would produce toxic substances harmful to living spiny lobsters which would either move away or die. An infected area is apparently avoided by the lobsters for years. South African fishermen normally grind up the lobster waste before discarding it. That procedure is said to have no harmful effects. (United States Embassy, Pretoria, August 4, 1965.)



## Spain

### FISHERY TRENDS AT VIGO, APRIL-JUNE 1965:

**Landings and Prices:** Fishery landings at the Port of Vigo, Spain, in April-June 1965 totaled 19,021 metric tons valued at 234.7 million pesetas (US\$3.9 million), up 40 percent in quantity and 23 percent in value from landings in the first quarter of 1965. As compared with April-June 1964, the second quarter 1965 landings were up 1 percent in quantity and nearly 10 percent in value. Prices dropped during the second quarter of 1965 because the demand from canning plants was light and catches of low-priced horse mackerel were up.

valued at 208 million pesetas (\$3.5 million). This compared with 8,550 tons valued at 157 million pesetas (\$2.6 million) during the previous quarter, and 2,738 tons (value not given) in the second quarter of 1964. Of the total frozen fish landings in April-June 1965, 10,468 tons (about 90 percent) was small hake. Frozen fish sell for about half the price of fresh fish.

**Canned Fish Industry:** Mainly as a result of the very low sardine catches, activity in the fish-canning industry in April-June 1965 was very limited. Some canneries bought imported frozen tuna (mostly from Japanese vessels) and were thus able to keep busy. Other canneries bought what sardines they

Table 1 - Landings and Average Ex-Vessel Prices of Selected Species at Vigo, April-June 1965 with Comparisons

Species	1965						1964		
	April-June			January-March			April-June		
	Quantity	Average Price		Quantity	Average Price		Quantity	Average Price	
	Metric Tons	Pesetas/Kilo	US\$/Lb.	Metric Tons	Pesetas/Kilo	US\$/Lb.	Metric Tons	Pesetas/Kilo	US\$/Lb.
Octopus . . . . .	3,581	6.84	5.2	3,834	5.07	3.8	3,495	5.03	3.8
Horse mackerel . .	3,315	3.54	2.7	1,617	4.67	3.5	3,431	2.58	2.0
Pomfret . . . . .	2,368	17.23	13.0	131	28.01	21.2	87	14.56	11.0
Small hake . . . .	1,370	36.31	27.5	1,615	38.02	28.8	2,694	29.93	22.6
Sardines . . . . .	549	7.24	5.5	-	-	-	585	5.86	4.4

The beginning of the 1965 sardine season was very discouraging for the second year in a row. The 1964 total sardine catch, however, was not too bad due to the very large and unexpected catches in the third and fourth quarters of that year. Fishermen are hoping for a repetition of those catches this year. The first days of the yellowfin tuna season, which started late in June, yielded a catch of 227 metric tons which sold at the Vigo Exchange at an average

could get and also canned some pomfret and shellfish.

A recent collective agreement has increased salaries for workers in fish canning plants by about 30 percent. This further increases the already high working costs of canneries in the area.

Canned fish exports during April-June 1965 were considerably higher than for previous periods; the increase over the same period a year earlier is estimated to be about double. The increase in the rate of the tax rebate on exports was undoubtedly the main factor for this recovery. (United States Consulate, Vigo, July 16, 1965.)

Note: See *Commercial Fisheries Review*, July 1965 p. 91.

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### FISH MEAL AND OIL PRODUCTION AND FOREIGN TRADE, 1964:

Production of fish meal in Spain during 1964 increased to 37,109 metric tons from 33,176 in 1963. It is estimated that only about 9 percent of total fishery landings in 1964 was consumed directly by the fish-reduction industry. The bulk of the raw material for the reduction plants is from waste and offal from filleting, canning, and other fish-processing

Table 2 - Distribution of Fishery Landings at Vigo, April-June 1965 with Comparisons

Period	Shipped Fresh to Domestic Markets	Canned	Other Distribution (Smoking, drying, fish meal, etc.) and Local Consumption
	(Metric Tons)		
2nd Quarter 1965	9,643	1,288	8,090
1st Quarter 1965	7,113	1,109	5,330
2nd Quarter 1964	11,013	1,545	6,197

price of 35.31 pesetas a kilo (26.7 cents a pound). During the same period in 1964, 230 tons sold at 32.01 pesetas a kilo (24.2 cents a pound).

Landings of frozen fish by the Vigo trawler fleet (not included with fresh fish landings) during April-June 1965 totaled 11,618 tons



## Spain (Contd.):

industries. Spain's imports of fish meal dropped to 40,457 tons in 1964 from 76,291 in 1963.

Production of fish oil increased to 2,070 tons from 1,811 in 1963. Fish oil imports dropped to 3,525 tons in 1964 from 5,368 in 1963. (Foreign Agriculture, August 9, 1965.)

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#### FISHING FLEET EXPANDS WITH THE ADDITION OF NEW TRAWLERS IN 1964:

During 1964, the Spanish fishing industry continued to develop under the impulse received from the Law for the Renovation of the Fishing Fleet promulgated in 1962. Since then there have been major changes in the long-range Spanish fleet. A large number of new, modern vessels have been built with official assistance or through private initiative. The new vessels have been used throughout the Atlantic, reaching as far as South Africa and South America. Other units are being built and shipbuilders have sufficient orders to keep them busy for at least 2 years.

(Editor's Note: The Law for the Renovation of the Spanish Fishing Fleet granted a concession of 4 billion pesetas or US\$66.7 million for the modernization of the fishing fleet between 1962 and 1971. Under the law, low-interest loans are authorized for 80 percent of the cost of building new fishing vessels. Preferential treatment is authorized for vessel construction plans which include modern equipment.)

A total of 92 new fishing vessels was added to the Spanish fleet in 1964. Sixteen shipyards in northern and northwestern Spain built those vessels, as well as 2 additional vessels for Chile, 1 for Cuba, and another for France. The new vessels included 58 conventional trawlers without freezing facilities (their catch is packed in ice), 29 freezer trawlers, and 9 trawlers which combine the two systems. Two of the trawlers are easily adaptable and can be used as tuna purse seiners; they have live-bait tanks and the following characteristics: length 36.80 meters (120.7 feet), gross tonnage 290, and a freezing capacity of 20 metric tons a day.

Spanish yards are also building several freezer stern-trawlers to fish for shellfish (mainly shrimp). The main characteristics of the new vessels are: length 20.28 meters (41 feet), gross tonnage 154, hold capacity 50

cubic meters (65.4 cubic yards), and freezing capacity 1.8 metric tons in 24 hours. They are reportedly the first of their type ever built. (United States Consulate, Vigo, July 13, 1965.)

Note: See Commercial Fisheries Review, Mar. 1964 p. 68, and June 1962 p. 62.



#### U.S.S.R.

##### ANTARCTIC FISHING GROUNDS FOUND BY RESEARCH VESSEL

The Soviet research vessel Gnevni has completed a 9-months exploratory trip to Antarctica. During the cruise, Soviet scientists discovered several rich fishing grounds. Between the Ross Sea and the Sandwich Islands maximum catches of fish per hour amounted to 20 metric tons. Crustaceans were also extremely abundant in that area.

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##### NEW SERIES OF LARGE STERN TRAWLERS TO BE BUILT BY EAST GERMANY:

The Soviet Union concluded a contract in mid-1965 with the People's Shipyards in Stralsund, East Germany, for the delivery of 103 large stern trawlers. Named Atlantik, this new class of fishing vessels will be of 3,200 gross tons, 250 feet long, 40 feet wide, and will have engines generating about 2,600 hp. The trawlers will be able to remain at sea for 2 months. Original plans called for delivery of the first Atlantik vessel by January 1966 but recent reports indicate that due to a speed-up in production at the Stralsund shipyards, the first delivery may be made before the end of 1965.

The new highly-automated vessels will replace the present Tropik series of large stern trawlers which were also built at Stralsund. The new series will be somewhat larger than the 2,600-gross-ton Tropiks and will have more refrigeration space, greater loading capacity and catch capability, and will also be faster. Because of automation, however, their crews will be smaller than those of Tropik-class trawlers.

The beginning of a new vessel series indicates that East Germany is about to deliver the last of the 65 Tropik stern trawlers which the Soviets ordered in 1961. Despite initial delays and difficulties, East Germany was able to produce about 2 Tropiks a month in

## U.S.S.R. (Contd.):

1964 and in 1965. It is estimated that the Atlantiks will be launched at about the same rate.

Like the Tropiks, the new vessels will fish in the North and Northwest Atlantic, off the North and South African coasts, and will probably be used in expanding Soviet fishing off South American coasts. (United States Mission, Berlin, May 28, 1965, and other sources.)

Note: See Commercial Fisheries Review, June 1965 p. 80.

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## UNDERWATER LABORATORY PLANNED:

In the Soviet Union, plans for an underwater laboratory for the study of fish behavior are being prepared by the Leningrad Design Institute of the Fishing Fleet (Giprorybflot). The laboratory will allow 5 hydronauts to stay submerged in depths of up to 300 meters (984 feet) for a maximum of 15 days.



## United Kingdom

## FROZEN PROCESSED WHITE FISH SUPPLY SITUATION, JANUARY-MARCH 1965:

British domestic production of frozen white fish products in January-March 1965 totaled 18,599 long tons, a gain of 7 percent over the first quarter of 1964. Imports of frozen white fish were also up in the first quarter of 1965 due mainly to larger shipments from Norway and Iceland. Domestic sales still take the major share of the British frozen white fish pack, but rising exports accounted for 17 percent of total sales in January-March 1965.

In preparing the British domestic pack of frozen white fish in January-March 1965, a total of 36,248 tons of whole fish was used, of which 24,352 tons were cod and codling, and 11,896 tons were other species.

Note: See Commercial Fisheries Review, July 1964 p. 79.

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## SCOTLAND EXPORTS FROZEN SCALLOPS TO EUROPEAN CONTINENT:

Scallops fished off the northwest coast of Scotland are being processed at Mallaig, Scotland, and exported by air to the European continent. In July 1965, three vessels operated by a fishing firm on the Isle of Man were landing good quantities at that Scottish port, most of which were frozen for export.

The freezing plant used at Mallaig was rented by the fishing firm specifically for freezing scallops for export. (Fish Trades Gazette, July 24, 1965.)

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## FISHERY LOAN INTEREST RATES REVISED:

The British White Fish Authority announced that their rates of interest on loans made as from July 17, 1965, would be as follows:

For fishing vessels of not more than 140 feet, new engines, nets and gear: on loans for not more than 5 years;  $7\frac{1}{2}$  percent (increase  $\frac{1}{4}$  percent); on loans for more than 5 years but not more than 10 years,  $7\frac{1}{2}$  percent (increase  $\frac{1}{4}$  percent); on loans for more than 10 years but not more than 15 years,  $7\frac{3}{8}$  percent (increase  $\frac{1}{8}$  percent); on loans for more than 15 years but not more than 20 years,  $7\frac{1}{2}$  percent (increase  $\frac{1}{4}$  percent).

British Supply and Disposition of Frozen Processed White Fish, January-March 1964-1965

Item	January-March 1965			January-March 1964		
	Institutional Pack	Consumer Pack	Total Pack	Institutional Pack	Consumer Pack	Total Pack
..... (Long Tons) .....						
<b>Supply:</b>						
Opening stocks, January 1 . . .	10,841	6,136	16,977	8,914	7,570	16,484
Production . . . . .	7,786	10,813	18,599	7,643	9,681	17,324
Imports . . . . .	4,450	1,383	5,833	3,068	1,835	4,903
<b>Total Supply . . . . .</b>	<b>23,077</b>	<b>18,332</b>	<b>41,409</b>	<b>19,625</b>	<b>19,086</b>	<b>38,711</b>
<b>Disposition:</b>						
Home market sales . . . . .	10,268	9,879	20,147	9,678	9,868	19,546
Exports 1/ . . . . .	2,203	2,015	4,218	1,573	899	2,472
Closing stocks, March 31 . . .	10,606	6,438	17,044	8,374	8,319	16,693

1/Includes small quantity of ships' stores and shipments to British Government installations abroad.

Source: British White Fish Authority.

## United Kingdom (Contd.):

The rate to processing plants for loans of not more than 20 years is unchanged at 7  $\frac{3}{4}$  percent.

The rates on advances made before July 17, 1965, are unchanged. (Fish Trades Gazette, July 24, 1965.)

Note: See Commercial Fisheries Review, Sept. 1965 p. 79.

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## REDUCED SUBSIDY RATES PROPOSED:

Cuts of 10 percent in operating subsidies for the offshore trawler fleet, the inshore fleet, and herring fishermen were recommended to the British Parliament on July 30, 1965, by the Minister of Agriculture, Fisheries, and Food. The Minister said the rates could be reduced because of the continued improvement in the overall British catch.

White Fish Subsidy: Subsidy payments to offshore vessels are based on time spent at sea while payments to inshore vessels are based on landings.

Following are the proposed new offshore rates for distant-water, middle-water, and near-water vessels:

Type of Vessel	Payment	Per Day at Sea
	<u>£</u>	<u>US\$</u>
<u>Basic Rates for Vessels 80 Feet or More in Length:</u>		
Vessels between 80 and 110 feet . . . .	6.75	18.90
Vessels between 110 and 140 feet . . . .	9.75	27.30
Vessels 140 feet and over . . . . .	11.25	31.50
<u>Special Rates for Vessels 80 Feet or More in Length:</u>		
<u>Motor Vessels:</u>		
Between 80 and 100 feet fishing from Fleetwood . . . . .	3.00	8.40
Between 100 and 110 feet fishing from: Northshields or Hartlepool . . . . .	2.00	5.60
Milford Haven . . . . .	7.00	19.60
Between 110 and 120 feet fishing from Granton or Fleetwood . . . . .	6.00	16.80
Between 120 and 130 feet fishing from Fleetwood or Milford Haven . . . . .	6.00	16.80
Between 160 and 170 feet fishing from Fleetwood . . . . .	6.00	16.80
Oil-burning steam vessels of 170 to 180 feet (built after Dec. 31, 1955) fishing from Fleetwood . . . . .	6.00	16.80
<u>Rates for Vessels Between 60 and 80 Feet:</u>		
Vessels between 60 and 65 feet . . . .	£5.40	15.12
Vessels between 65 and 80 feet . . . .	6.75	18.90
1/ The same rate applies to seiners under 60 feet which normally make voyages of 8 days or more.		

The subsidy rates for other white fish vessels (inshore vessels under 60 feet in length)

are based on landings. The proposed rates depend on the type of fish landed and vary from 4d. per stone (33.3 U.S. cents per 100 pounds) to 1s. 1  $\frac{1}{2}$ d. per stone (\$1.12 per 100 pounds).

Herring Subsidy: The proposed subsidy rates per day at sea for herring vessels over 40 feet are: vessels of 40 to 60 feet, £5 17s. (\$16.38); vessels of 60 to 80 feet, £6 6s. (\$17.64); and vessels of 80 feet or more, £11 14s. (\$32.76).

Special subsidy rates would be provided for herring landed for reduction. (Fishing News, July 16, 1965, and United States Embassy, London, August 13, 1965.)

Note: See Commercial Fisheries Review, Sept. 1962 p. 109.



## Venezuela

## SHRIMP TRANSPORT METHODS:

United States airborne imports of shrimp from Venezuela in 1964 totaled about 7.1 million pounds. Until early 1965, shrimp shipments from Venezuela to the United States moved almost entirely by air, with two Venezuelan national airlines as the primary carriers. Then in February 1965 small transport vessels entered the field and began handling an increasing share of the exports. By mid-July 1965, the vessels had hauled almost 1,000 metric tons of frozen shrimp from Venezuela to the United States Southern Coast. Shipments aboard the vessels have ranged from 30 to 100 tons.

The cost of shipping frozen shrimp from Maracaibo, Venezuela, to Miami, Fla., by air aboard Venezuelan planes is reported to be about 4 cents a pound, as against a freight cost by sea of 3 cents a pound.

Sea shipment of shrimp from Venezuela may increase during the year. Most of the shrimp plants along the Venezuelan coast are expanding their processing capacity and have expressed an interest in refrigerated vessel transport. (United States Embassy, Caracas, August 21, 1965.)

\* \* \* \* \*

## SHRIMP INDUSTRY EXPANDING:

Venezuela's shrimp industry in the Maracaibo area experienced a sharp recession in

## Venezuela (Contd.):

the early 1960's, but again is expanding. Maracaibo is located at the mouth of Lago de Maracaibo in the western part of the country. Seven shrimp-processing plants are in operation there. They are supported by shrimp catches of a fleet of 45 trawlers and some 4,000 lake net fishermen. Several of the plants are being equipped with freezing facilities which will increase plant capacity threefold. Processing of individually quick-frozen shrimp will be started before the end of this year. Also, a substantial increase in the trawler fleet is programmed. Approximately the entire production will be exported to the United States.

Observers have noted that if the principal plants succeed in operating at near their projected capacity of 50,000 to 70,000 pounds of processed shrimp daily, Venezuela could expand its export market.

United States shrimp imports from Venezuela totaled 7.9 million pounds in 1964. Of the Latin American countries exporting shrimp to the United States, only Mexico with 72 million pounds and Panama with 12 million pounds outranked Venezuela in 1964 as suppliers of the United States market. (United States Embassy, Caracas, July 24, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 12, and April 1965 p. 90.

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#### TUNA AND SHRIMP FISHERIES INVESTMENT OPPORTUNITY:

Venezuelan interests are seeking a joint tuna and shrimp fishing venture with United States investors experienced in processing methods. The Venezuelan sponsors have completed a 3-year planning study and taken preliminary steps to organize a new fishery enterprise known as Golfo Internacional de Venezuela C. A. Pesquera.

Authorized capital for the new enterprise is placed at Bs. 4 million (US\$888,888), to be divided equally between Venezuelan and U.S. investors. Additional financing of Bs. 8 million (\$1,777,777) is to be obtained through loans. The development agency of the Venezuelan Government is expected to take Bs. 1 million (\$222,222) of the authorized capital

(Venezuelan share) and to provide Bs. 4 million (\$888,888) of the additional investment requirements.

Plans for the new enterprise include a processing plant at Guiria on the Gulf of Paria. The proposed plant would produce frozen shrimp, frozen tuna fillets, and fish and shell-fish meal. The plant is to have a supporting fleet of a mothership with a cargo capacity of 450 metric tons, 9 shrimp vessels, and 2 tuna purse seiners of 110 and 130 tons capacity. One sardine purse seiner of about 100 tons capacity would be needed to supply the fish meal unit. With custom-built vessels, the sponsors feel relatively sure of being able to adequately supply the plant's shrimp requirements. The plant's shrimp production will be exported.

The company expects to be able to purchase from independent vessels a large part of its tuna requirements. (The privilege of importing tuna duty-free has been granted the company by the Venezuelan Government.) A number of foreign tuna vessels, particularly Japanese, fish in the area and are presently transshipping their catch through Port of Spain, Trinidad. On that assumption, capital requirements necessary to put the plant in operation have been placed at Bs. 6 million (\$1,333,333). That only includes the cost of the shrimp fleet. Initial operation is expected to be primarily the processing of frozen shrimp.

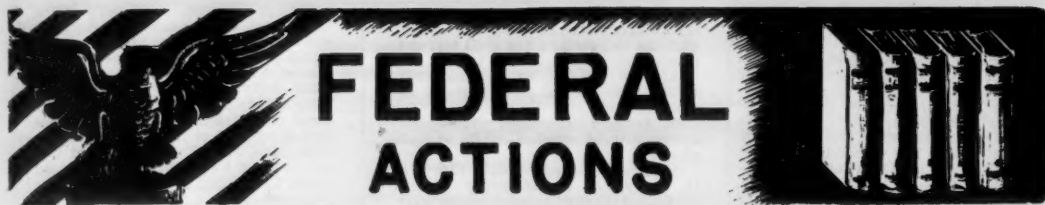
The proposed fishing enterprise is in the formative stage and its sponsors are receptive to some modification within the basic proposal which has the Venezuelan Government's approval. Certain concessions have been granted to the company because it proposes to open up a new fishing area believed to be productive, but as yet unproved.

Interested U. S. investors may write directly to Sr. Carlos Chacon, Golfo Internacional de Venezuela C.A. Pesquera, Cuarta Avenida de los Palos Grandes, Edificio Residencias Imperio, Piso 9<sup>o</sup>, Apartamento 94, Caracas, Venezuela. Correspondence may be in English. (United States Embassy, Caracas, July 20, 1965.)

Note: Venezuelan bolivares 4.5 equal US\$1.00.







## Agency for International Development

### LOAN TO HELP BANK FOR CHILEAN COOPERATIVES:

A private Cooperative Development Bank to provide financial, technical, and managerial services to Chile's cooperatives (including fishery cooperatives) will be established under the Alliance for Progress with loan assistance from the U. S. Agency for International Development (AID).

A US\$3,650,000 AID loan to IFICOOP (the bank's Spanish initials) will be supplemented by the equivalent of \$384,000 from Chilean sources. The \$4,034,000 total will be used chiefly as "seed" capital for the bank's operations. The bulk of AID loan funds, \$3.3 million, will be for re-lending to Chilean cooperatives including those engaged in farming and fishing, among others. (AID, July 15, 1965.)



## Department of the Interior

### FISH AND WILDLIFE SERVICE

#### BUREAU OF COMMERCIAL FISHERIES

### REVISED U. S. STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP:

Revised U. S. standards for grades of frozen raw breaded shrimp were published in the Federal Register, August 3, 1965, as an amendment to Title 50, Code of Federal Regulations, Part 262.

The proposed revision will upgrade the standards for frozen raw breaded shrimp grades, particularly as concerns: (1) uniformity, (2) condition of coating (batter and breading), and (3) quality loss in shrimp prior to processing. The evaluation factors for flavor and odor would also be upgraded.

Following are the revised standards as published in the Federal Register, August 3, 1965:

## Title 50—WILDLIFE AND FISHERIES

### Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

#### SUBCHAPTER G—PROCESSED FISHERY PRODUCTS, PROCESSED PRODUCTS THEREOF, AND PROCESSED FOOD PRODUCTS

### PART 262—U.S. STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP

On pages 3598-3601, inclusive, of the FEDERAL REGISTER of March 18, 1965, there was published a notice and text of a proposed amendment of Part 262—U.S. Standards for Grades of Frozen Raw Breaded Shrimp of Title 50, Code of Federal Regulations.

Interested persons were given 30 days to submit written comments, suggestions, or objections with respect to the proposed amendment. Two responses to the proposal were received.

After consideration of all relevant matters presented, including the proposal set forth in the aforesaid notice, the proposed revised part is hereby adopted with changes and is set forth below.

Four changes are made in the revised part from the revision proposed in the FEDERAL REGISTER of March 18, 1965 (30 F.R. 3598), as follows:

1. Section 262.21(p) Damaged Shrimp (thawed state) was deleted.
2. The phrase "or other methods giving equivalent results" was deleted from § 262.21(v).
3. "+2" was added to the formula in § 262.21(v) (2) (ii) for calculating the percent of shrimp material.
4. Factor 7, Damaged Shrimp, in Table II was deleted.

The revised part is issued pursuant to sections 203 and 205 of Title II of the Agricultural Marketing Act of 1946, 60 Stat. 1087, 1090, as amended, 7 U.S.C. sections 1622 and 1624 (1958), as transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of 1956, 70 Stat. 1122 (1956), 18 U.S.C. section 742e (1958).

This part shall become effective at the beginning of the 30th calendar day following the date of this publication in the FEDERAL REGISTER, Except: That the requirements for uniformity, condition of coating, and degree of dehydration, shall

become effective at the beginning of the 120th calendar day following the date of this publication in the FEDERAL REGISTER. This will give the breaded shrimp industry an opportunity to modify and adjust its operations so that it can meet the new requirements of the higher standards of quality for breaded shrimp.

Breaded shrimp inspected and graded in accordance with this revised part between the 30th and the 120th day following the date of this publication in the FEDERAL REGISTER shall meet the requirements for uniformity, condition of coating and degree of dehydration as provided in Part 262—U.S. Grade Standards for Raw Breaded Shrimp and published in the FEDERAL REGISTER (25 F.R. 8444) dated September 1, 1960, as amended by interim regulations published on page 7444 of the FEDERAL REGISTER dated June 5, 1965.

DONALD L. MCKERNAN,  
Director, Bureau of  
Commercial Fisheries.

JULY 30, 1965.

PRODUCT DESCRIPTION, STYLES, TYPES, AND GRADES

SEC.	Product description.
262.1	Styles of frozen raw breaded shrimp.
262.2	Types of frozen raw breaded shrimp.
262.3	Grades of frozen raw breaded shrimp.

FACTORS OF QUALITY

262.11	Ascertaining the grade.
262.12	Factors evaluated on the product in the frozen breaded state.
262.13	Factors evaluated on thawed debreaded product.

DEFINITIONS AND METHODS OF ANALYSIS

262.21	Definitions and methods of analysis.
262.22	Lot Certification Tolerances
262.25	Tolerances for certification of officially drawn samples.

**AUTHORITY:** The provisions of this Part 262 issued under section 6, 70 Stat. 1122, 16 U.S.C. section 742e; and sections 203 and 205, 60 Stat. 1087, 1090, as amended, 7 U.S.C. 1622, 1624.

PRODUCT DESCRIPTION, STYLES, TYPES, AND GRADES

§ 262.1 Product description.

Frozen raw breaded shrimp are whole, clean, wholesome, headless, peeled, and deveined shrimp, of the regular commercial species, coated with a wholesome, suitable batter and/or breading. Whole shrimp consist of five or more segments of un mutilated shrimp flesh. They are prepared and frozen in accordance with good commercial practice and are maintained at temperatures necessary for the preservation of the product. Frozen raw breaded shrimp contain not less than 50 percent by weight of shrimp material. Individual shrimp and/or pieces consolidated into larger units and covered with breading are not considered for grading under this standard.

§ 262.2 Styles of frozen raw breaded shrimp.

(a) *Style I. "Regular Breaded Shrimp"* are frozen raw breaded shrimp containing a minimum of 50 percent of shrimp material.

(b) *Style II. "Lightly Breaded Shrimp"* are frozen raw breaded shrimp containing a minimum of 65 percent of shrimp material.

§ 262.3 Types of frozen raw breaded shrimp.

(a) *Type I—Breaded fantail shrimp—*  
(1) *Subtype A. Split (butterfly) shrimp* with the tail fin and the shell segment immediately adjacent to the tail fin.

(2) *Subtype B. Split (butterfly) shrimp* with the tail fin but free of all shell segments.

(3) *Subtype C. Split (butterfly) shrimp* without attached tail fin or shell segments.

(b) *Type II—Breaded round shrimp—*  
(1) *Subtype A. Round shrimp* with the tail fin and the shell segment immediately adjacent to the tail fin.

(2) *Subtype B. Round shrimp* with the tail fin but free of all shell segments.

(3) *Subtype C. Round shrimp* without attached tail fin or shell segments.

§ 262.4 Grades of frozen raw breaded shrimp.

(a) "U.S. Grade A" is the quality of frozen raw breaded shrimp that when cooked possesses a good flavor and odor, and that for those factors which are rated in accordance with the scoring system outlined in the following sections the total score is not less than 85 points.

(b) "U.S. Grade B" is the quality of frozen raw breaded shrimp that when cooked possesses a reasonably good flavor and odor, and that for those factors which are rated in accordance with the scoring system outlined in the following sections the total score is not less than 70 points.

(c) "Substandard" is the quality of frozen raw breaded shrimp that fail to meet the requirements of "U.S. Grade B."

FACTORS OF QUALITY

§ 262.11 Ascertaining the grade.

**General.** In addition to considering other requirements outlined in the standard, the following quality factors are evaluated in ascertaining the grade of the product.

(a) Factors not rated by score points: Flavor and odor. Flavor and odor are determined by organoleptic means after the product has been cooked in a suitable manner (§ 262.21(w)).

(b) Factors rated by score points: The quality of the product with respect to factors scored is expressed numerically on the scale of 100. Deductions from the maximum possible score of 100 are assessed for essential variations of quality within each factor. The score of frozen raw breaded shrimp is determined by observing the product in the frozen and thawed states.

§ 262.12 Factors evaluated on the product in the frozen breaded state.

Factors affecting qualities that are measured on the product in the frozen state are: Loose breading and frost, ease of separation, uniformity of size, condition of coating, extraneous material, and damaged breaded shrimp. For the purpose of rating the factors that are scored in the frozen state, the schedule of point deductions in Table 1 applies. This schedule of point deductions is based on the examination of one complete individual package (sample unit) regardless of the net weight of the contents of the package.

§ 262.13 Factors evaluated on thawed debreaded product.

Factors affecting qualities that are measured on the product in the thawed debreaded state are: Degree of deteriora-

tion, dehydration, sand veins, black spot, extra shell, extraneous material, and swimmerets. For the purpose of rating the factors that are scored in the thawed debreaded state, the schedule of point deductions in Table 2 applies. This schedule of point deductions is based on the examination of 20 whole shrimp selected at random from one or more packages. Examinations of this sample of 20 whole shrimp is continued under § 262.21(u).

DEFINITIONS AND METHODS OF ANALYSIS

§ 262.21 Definitions and methods of analysis.

(a) "Fantail shrimp": This type is prepared by splitting and peeling the shrimp except that for subtype A, the tail fin remains attached and the shell segment immediately adjacent to the tail fin remains attached. Subtype B, the tail fin remains, but the shrimp are free of all shell segments. Subtype C, the shrimp are free of tail fins and all shell segments.

(b) "Round shrimp": This type is the round shrimp, not split. The shrimp are peeled except that for subtype A, the tail fin remains attached and the shell segment immediately adjacent to the tail fin remains attached. Subtype B, the tail fin remains, but the shrimp are free of all shell segments. Subtype C, the shrimp are free of all shell segments and tail fins.

(c) Good flavor and odor: "Good flavor and odor", essential requirements for a Grade A product, means that the cooked product has flavor and odor characteristics of freshly caught or well-refrigerated shrimp and the breading is free from staleness and off-flavors and off-odors of any kind. Iodoform is not to be considered in evaluating the product for flavor and odor.

(d) Reasonably good flavor and odor: "Reasonably good flavor and odor" minimum requirement of Grade B products, means that the cooked product may be somewhat lacking in the good flavor and odor characteristics of freshly caught or well-refrigerated shrimp but is free from objectionable off-flavors and objectionable off-odors of any kind.

(e) "Dehydration" refers to the occurrence of whitish areas on the exposed ends of the shrimp (due to the drying of the affected area) and to a generally desiccated appearance of the meat after the breading is removed.

(f) "Deterioration" refers to any detectable change from the normal good quality of freshly caught shrimp. It is evaluated by noting in the thawed product deviations from the normal odor and appearance of freshly caught shrimp.

(g) "Extraneous material" consists of non-edible material such as sticks, seaweed, shrimp thorax, or other objects that may be accidentally present in the package.

(h) Slight: "Slight" refers to a condition that is scarcely noticeable but does affect the appearance, desirability, and/or eating quality of breaded shrimp.

(i) Moderate: "Moderate" refers to a condition that is conspicuously noticeable but that does not seriously affect the appearance, desirability, and/or eating quality of the breaded shrimp.

(j) Marked: "Marked" refers to a condition that is conspicuously notice-

TABLE 1—SCHEDULE OF POINT DEDUCTIONS FOR RATING IN FROZEN BREADED STATE

Factor	Quality description	Deductions allowed
		Points
1. Loose breading or frost.....	2 percent but less than 3 percent..... 3 percent but less than 5 percent..... 5 percent or more.....	5 10 21
2. Ease of separation.....	Separate easily after being removed from carton and exposed to room temperature for not more than 4 minutes. Separate easily after being removed from carton and exposed to room temperature for not more than 6 minutes. Does not separate easily after being removed from carton and exposed to room temperature for 6 minutes.	3 6 10
3. Uniformity.....	Ratio of weight of largest to smallest breaded shrimp in sample unit as defined under section 362.21(U): Up to 1.50..... 1.51-1.60..... 1.61-1.70..... 1.71-1.80..... 1.81-1.90..... 1.91-2.00..... 2.01-2.10..... 2.11-2.20..... 2.21-2.30..... 2.31-2.40..... Over 2.40.....	0 1 2 3 4 5 6 7 8 9 10
4. Condition of coating.....	Degree of halo or balling up or holidays (identify type of defect by circling the proper word): Slight—each 10 percent by count or fraction thereof..... Moderate—each 10 percent by count or fraction thereof..... Marked—each 10 percent by count or fraction thereof..... Excessive—each 10 percent by count or fraction thereof.....	1 2 4 10
5. Damaged breaded shrimp.....	For each 5 percent by count or fraction thereof..... Tail fin broken or missing, each 1 percent or fraction thereof (except in Type I, subtype C, and Type II, subtype C).....	3 1
6. Extraneous material.....	If extraneous material, except filthy or deleterious substances, are found in more than one package per lot, the entire lot shall be declared substandard. <sup>1</sup>	

<sup>1</sup> Filthy or deleterious substances in food products constitute a violation of the Food, Drug, and Cosmetic Act. Products containing such substances are ineligible for the purpose of applying this document.

TABLE 2—SCHEDULE FOR POINT DEDUCTIONS FOR EXAMINATION IN THAWED, DEBREADED STATE

Factor	Quality description	Deductions allowed
		Points
1. Degree of dehydration.....	Slight—each shrimp..... Moderate—each shrimp..... Marked—each shrimp..... Excessive—each shrimp.....	1 2 3 16
2. Deterioration.....	Slight—each shrimp..... Moderate—each shrimp..... Marked—each shrimp..... Excessive—each shrimp (provided that, if excessive deterioration occurs in more than one sample unit per sample, i.e. entire lot shall be declared substandard).....	2 6 10 20
3. Sand veins.....	For each dark vein present deduct according to the following schedule: Equivalent in length to two segments..... Equivalent in length to three segments..... Equivalent in length to four or more segments.....	1 2 3
4. Black spot.....	Slight but obvious, on average..... Moderate, on average..... Marked—each shrimp.....	3 6 9
5. Extra shell (see subtypes definition).....	(beyond first segment adjacent to tail fin only for Type I, subtype A, and Type II, subtype A): Less than one whole extra shell segment..... One extra segment or more.....	1 2
6. Swimmers.....	For last pair only adjacent to tail fin..... For more than last pair.....	1 2
7. Extraneous material.....	If extraneous material, except filthy or deleterious substances, are found in more than one package per lot, the entire lot shall be declared substandard. <sup>1</sup>	

<sup>1</sup> Filthy or deleterious substances in food products constitute a violation of the Food, Drug, and Cosmetic Act. Products containing such substances are ineligible for the purpose of applying this document.

able and that does seriously affect the appearance, desirability, and/or eating quality of the breaded shrimp.

(k) Excessive: "Excessive" refers to a condition that is very noticeable and is seriously objectionable and the product cannot be graded above Grade B; this is a limiting rule.

(l) Halo: "Halo" means an easily recognized fringe of excess batter and breading extending beyond the shrimp flesh and adhering around the perimeter or flat edges of a split (butterfly) breaded shrimp.

(m) Balling up: "Balling up" means the adherence of lumps of the breading material to the surface of the breaded coating, causing the coating to appear rough, uneven, and lumpy.

(n) Holidays: "Holidays" means voids in the breaded coating as evidenced by bare or naked spots.

(o) Damaged frozen raw breaded shrimp: "Damaged frozen raw breaded shrimp" means frozen raw breaded shrimp that have been separated into two or more parts or that have been crushed or otherwise mutilated to the

extent that their appearance is materially affected.

(p) Black spot: "Black spot" means any blackened area that is markedly apparent on the flesh of the shrimp.

(q) Sand vein: "Sand vein" means any black or dark sand vein that has not been removed, except for that portion under the shell segment adjacent to the tail fin when present.

(r) Extra shell: "Extra shell" means any shell segment(s) or portion thereof, contained in the breaded shrimp except the first segment adjacent to the tail fin for Type I, subtype A, and Type II, subtype A.

(s) Loose breading and frost: "Loose breading and frost" is considered to be part of the net weight and is determined by use of a balance and by following the steps given below:

1. Remove the overwrap.
2. Weigh carton and all contents.
3. Transfer breaded shrimp to balance and weigh.
4. Weigh carton less shrimp but including waxed separators and inserts (if used), crumbs, and frost.
5. Remove crumbs and frost from carton and separators.
6. Weigh cleaned carton and separators.
7. Calculate loose breading and frost:

$$\text{Percent loose breading and frost} = \frac{(4)-(6)}{(2)-(6)} \times 100.$$

A proportionate amount of the loose breading and frost must be added to the weight of the sample in paragraph (v)(2)(ii) of this section.

(t) Uniformity: "Uniformity" is determined for packs of various sizes by the ratio of the weights of the largest to the smallest breaded shrimp as outlined by the following schedule:

Up to 10 oz.	3 largest/3 smallest
10.1 oz. to 1.5 lb.	6 largest/6 smallest
1.51 lb. to 2.5 lb.	9 largest/9 smallest
Over 2½ lb.	10 largest/10 smallest

(u) Percent shrimp material: "Percent shrimp material" means the percent by weight of shrimp material in a sample as determined by the method described below. This calculation is based on 20 whole shrimp as stipulated in § 262.13.

(1) Equipment needed:

(i) Two-gallon container approximately 8 inches in diameter.

(ii) Two-vaned wooden paddle, each vane measuring approximately 1½ inches by 8¾ inches.

(iii) Stirring device capable of rotating the wooden paddle at 120 rpm.

(iv) Balance accurate to 0.01 ounce (0.1 gram).

(v) U.S. standard sieve—½-inch sieve opening; 12-inch diameter.

(vi) U.S. standard sieve—ASTM—No. 20, 12-inch diameter.

(vii) Forceps, with blunt points.

(viii) Shallow baking pan.

(ix) Rubber policeman to remove bits of breading from shrimp.

(2) Procedure:

(i) Weigh sample (20 shrimp) to be debreaded. Fill container three-fourths full of water at 70°-80° F. Suspend the paddle in the container leaving a clearance of at least 5 inches below the paddle vanes, and adjust speed to 120 rpm. Add shrimp and stir for 10 minutes. Stack the sieves, the ½-inch mesh over the No. 20 and pour contents of container onto them. Set the sieves under a faucet, preferably with spray attached, and

rinse the shrimp without rubbing the flesh, being careful to keep all rinsings over the sieves and not having the stream of water hit the shrimp on the sieve directly. Use a rubber policeman to remove adhering breading. Lay the shrimp out singly on the sieve as rinsed, split side down and tails up. Remove top sieve and drain on a 45-degree angle for 2 minutes, then transfer shrimp to balance. Rinse contents of the No. 20 sieve onto a shallow baking pan and collect any particles of shrimp material (flesh, tail fin), and add to shrimp on balance and weigh.

(11) Calculate percent shrimp material:

$$\text{Percent shrimp material} = \frac{\text{Weight of debreaded sample}}{(\text{Weight of sample}) + (\text{weight of sample} \times \text{percentage loose breading and frost})} \times 100 + 2$$

(v) Cooked in a suitable manner: "Cooked in a suitable manner" means cooked in accordance with the instructions accompanying the product. If, however, specific instructions are lacking, the product for inspection is cooked as follows:

(1) Transfer the breaded shrimp, while still frozen, in a wire mesh deep fry basket sufficiently large to hold the shrimp in a single layer without touching one another.

(2) Lower the basket into a suitable liquid oil or hydrogenated vegetable oil at 350°-375° F. Cook for 3 minutes, or

until the shrimp attain a pleasing golden brown color.

(3) Remove basket from the oil and allow the shrimp to drain for 15 seconds. Place the cooked shrimp on a paper towel or napkin to absorb the excess oil.

#### LOT CERTIFICATION TOLERANCES

§ 262.25 Tolerances for certification of officially drawn samples.

The sample rate and grades of specific lots shall be certified in accordance with Part 260 of this chapter (Regulations Governing Processed Fishery Products, 25 F.R. 8427, Sept. 1, 1960).

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## U. S. FISHERY LOAN REQUIREMENTS REVISED:

Regulations governing fishery loans have been revised and no longer require that an applicant replace an existing vessel if the loan is to finance the purchase of a new or used vessel, announced Secretary of the Interior Stewart L. Udall on August 13, 1965. Public Law 89-85, signed by the President in July 1965, also expands the purposes for which fishery loan funds may be used and extends the authority to make such loans to June 30, 1970.

The fisheries loan fund, established by a section of the Fish and Wildlife Act of 1956, initially had an authorization of \$10 million, and was increased to \$20 million in 1958.

The loan program authorizes the Secretary of the Interior to make loans for financing and refinancing the operations of commercial fishing vessels and the maintenance, repair, purchase, or construction of such vessels and their gear.

Donald L. McKernan, Director of Interior's Bureau of Commercial Fisheries, which administers the fisheries loan program, said the revised regulations contain the provision that purchase of a new vessel must not cause economic injury to efficient vessel operators working in the area where the new vessel will operate.

Changes in the regulations as published by the Bureau of Commercial Fisheries in the Federal Register, August 11, 1965, follow:

## Title 50—WILDLIFE AND FISHERIES

### Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

#### SUBCHAPTER F—AID TO FISHERIES

### PART 250—FISHERIES LOAN FUND PROCEDURES

Public Law 89-85 amended section 4 of the Fish and Wildlife Act of 1956 extending the period during which the Secretary of the Interior is authorized to make fishery loans and expanding the purposes for which these loans can be made. It further provided that its provisions would become effective July 1, 1965. The revision of procedures set forth herein are those required to meet the provisions of Public Law 89-85. The primary change provides procedures for financing and refinancing loans for the purchase or construction of new or used fishing vessels. Other changes are technical or clarifying in nature. Inasmuch as the revisions contained herein relax current restrictions, and are required to bring the regulations into conformity with Public Law 89-85, the revised procedures

are hereby adopted and will become effective upon the date of publication in the FEDERAL REGISTER.

Part 250 is revised to read as follows:

Sec.	
250.1	Definition of terms.
250.2	Purposes of loan fund.
250.3	Interpretation of loan authorization.
250.4	Qualified loan applicants.
250.5	Basic limitations.
250.6	Purchase or construction loans.
250.7	Applications.
250.8	Processing of loan applications.
250.9	Approval of loans.
250.10	Interest.
250.11	Maturity.
250.12	Security.
250.13	Books, records, and reports.
250.14	Insurance required.
250.15	Penalties on default.

**AUTHORITY:** The provisions of this Part 250 issued under sec. 4, 70 Stat. 1121; 16 U.S.C. 742c and P.L. 89-85.

#### § 250.1 Definition of terms.

For the purposes of this part, the following terms shall be construed, respectively, to mean and to include:

- (a) *Secretary*. The Secretary of the Interior or his authorized representative.
- (b) *Person*. Individual, association, partnership or corporation, any one or all as the context requires.

(c) *State*. Any State, the territories and possessions of the United States, the Commonwealth of Puerto Rico, and the District of Columbia.

(d) *Fishery*. A segment of the commercial fishing industry engaged in the catching of a single species or a group of species of fish and shellfish. Any other species taken must be caught incidentally while fishing for and using gear designed for the capture of the species comprising the fishery.

(e) *No economic hardship to efficient vessel operators*. The determination that operation of a proposed vessel will not cause economic hardship to efficient vessel operators already operating in that fishery shall be made by the Secretary, taking into consideration the condition of the resource, the efficiency of the vessels and gear being operated in that fishery compared with the proposed vessel, the prospects of the market for the species caught, and the degree and duration of any anticipated economic hardship.

(f) *Act*. The Fish and Wildlife Act of 1956, as amended.

#### § 250.2 Purposes of loan fund.

The broad objective of the fisheries loan fund created by the Fish and Wild-



the Act of 1956, as amended, is to provide financial assistance which will aid the commercial fishing industry to bring about a general upgrading of the condition of both fishing vessels and fishing gear thereby contributing to more efficient and profitable fishing operations.

(a) Under section 4 of the act, the Secretary is authorized, among other things:

(1) To make loans for financing and refinancing of the cost of purchasing, constructing, equipping, maintaining, repairing or operating new or used commercial fishing vessels or gear.

(2) Subject to the specific limitations in the section, to consent to the modification, with respect to the rate of interest, time of payment of any installment of principal, or security, of any loan contract to which he is a party.

(b) All financial assistance granted by the Secretary must be for one or more of the purposes set forth in paragraph (a) of this section.

#### § 250.3 Interpretation of loan authorization.

The terms used in the act to describe the purposes for which loans may be granted are construed to be limited to the meanings ascribed in this section.

(a) *Commercial fishing vessels or gear.* The words "commercial fishing vessels or gear" mean vessels or gear of any size or type used for the catching of fish or shellfish for commercial purposes such as marketing or processing the catch.

(b) *Purchasing new or used commercial fishing vessels or gear.* The words "purchasing new or used commercial fishing vessels or gear" mean the purchase of vessels or gear.

(c) *Constructing new or used commercial fishing vessels or gear.* The words "constructing new or used commercial fishing vessels or gear" mean the construction of new or reconstruction of used vessels or gear.

(d) *Equipping new or used commercial fishing vessels or gear.* The words "equipping new or used commercial fishing vessels or gear" mean the purchase or installation of parts, machinery, or other items incident to outfitting of vessels or gear.

(e) *Maintaining new or used commercial fishing vessels or gear.* The words "maintaining new or used commercial fishing vessels or gear" mean the normal and routine upkeep of vessels or gear.

(f) *Repairing new or used commercial fishing vessels or gear.* The words "repairing new or used commercial fishing vessels or gear" mean the restoration or replacement of any worn or damaged part of vessels or gear.

(g) *Operating new or used fishing vessels or gear.* The words "operating new or used fishing vessels or gear" mean all phases of activity directly related to the operation of vessels engaged in catching of fish and shellfish by vessels or gear.

#### § 250.4 Qualified loan applicants.

(a) Any citizen residing or conducting business in any State shall be deemed to be a qualified applicant for such financial assistance if such citizen:

(1) Owns or operates a commercial fishing vessel of United States registry (if registration is required) used, or to be used, directly in the conduct of fishing operations, irrespective of the type, size,

power, or other characteristics of such vessel;

(2) Owns or operates any type of commercial fishing gear used directly in the catching of fish or shellfish;

(3) Can demonstrate to the satisfaction of the Secretary that he has the ability, experience, resources and other qualifications necessary for successful operation of the vessel or gear which he proposes to operate.

(4) Is a fishery marketing cooperative engaged in marketing all catches of fish or shellfish by its members pursuant to contractual or other enforceable arrangements which empower the cooperative to exercise full control over the conditions of sale of all such catches and disburse the proceeds from all such sales.

(b) Applications for financial assistance cannot be considered if the loan is to be used for:

(1) Any phase of a shore operation.

(2) Refinancing existing loans that are not secured by the fishing vessel or gear, or debts which are not maritime liens within the meaning of subsection P of the Ship Mortgage Act of 1920, as amended (46 U.S.C. 971).

(3) Refinancing existing mortgages or secured loans on fishing vessels or gear, or debts secured by maritime liens, except in those instances where the Secretary deems such refinancing to be desirable in carrying out the purpose of the Act.

(4) Repair or purchase of fishing gear or vessels where such fishing gear or vessels are not offered as collateral for the loan by the applicant.

(5) Financing a new business venture in which the controlling interest is owned by a person or persons who are not currently engaged in commercial fishing.

#### § 250.5 Basic limitations.

Applications for financial assistance may be considered only where there is evidence that the credit applied for is not otherwise available on reasonable terms (a) from applicant's bank of account, (b) from the disposal at a fair price of assets not required by the applicant in the conduct of his business or not reasonably necessary to its potential growth, (c) through use of the personal credit and/or resources of the owner, partners, management, affiliates, or principal stockholders of the applicant, or (d) from other known sources of credit. The financial assistance applied for shall be deemed to be otherwise available on reasonable terms unless it is satisfactorily demonstrated that proof of refusal of the desired credit has been obtained from the applicant's bank of account: *Provided*, That if the amount of the loan applied for is in excess of the legal lending limit of the applicant's bank or in excess of the amount that the bank normally lends to any one borrower, then proof of refusal should be obtained from a correspondent bank or from any other lending institution whose lending capacity is adequate to cover the loan applied for. Proof of refusal of the credit applied for must contain the date, amount, and terms requested. Bank refusals to advance credit will not be considered the full test of unavailability of credit and, where there is knowledge or reason to believe that credit is otherwise available on reasonable terms from sources other than such banks, the credit applied for cannot be granted notwithstanding the

receipt of written refusals from such banks.

#### § 250.6 Purchase or construction loans.

When the Secretary determines that an application is eligible on its face for the purchase or construction of a new or used vessel that will not replace an existing commercial fishing vessel, a notice shall be published in the *FEDERAL REGISTER* that such application is being considered and giving all interested parties a period of 30 days to submit evidence that the contemplated operation of such vessel will cause economic hardship or injury to efficient vessel operators already operating in that fishery. If such evidence is received, the Secretary will evaluate it along with such other evidence as may be available to him before making a determination that the contemplated operations of the vessel will or will not cause such economic injury or hardship. The foregoing procedure shall not apply in cases where the applicant seeks to replace a vessel lost or destroyed within 2 years of the date of the application.

#### § 250.7 Applications.

Any person desiring financial assistance from the fisheries loan fund shall make application to the Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior, Washington, D.C., 20240, on a loan application form furnished by that Bureau except that, in the discretion of the Secretary, an application made other than by use of the prescribed form may be considered.

If the application contains information deemed to be sufficient. Such application shall indicate the purposes for which the loan is to be used, the period of the loan, and the security to be offered.

#### § 250.8 Processing of loan applications.

If it is determined, on the basis of a preliminary review, that the application is complete and appears to be in conformity with established rules and procedures, a field examination shall be made. Following completion of the field investigation the application will be forwarded with an appropriate report to the Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior, Washington, D.C., 20240.

#### § 250.9 Approval of loans.

The Secretary will evidence his approval of the loan by issuing a loan authorization covering the terms and conditions for making the loan. Documents executed in connection with a loan shall be in a form approved by the Secretary. Any modification of the terms of a loan following its execution must be agreed to in writing by the borrower and the Secretary.

#### § 250.10 Interest.

The rate of interest on all loans which may be granted is fixed at 5 percent per annum.

#### § 250.11 Maturity.

The period of maturity of any loan which may be granted shall be determined and fixed according to the circumstances but in no event shall the date of maturity so fixed exceed a period of 10 years.

#### § 250.12 Security.

Loans shall be approved only upon the furnishing of such security or other reasonable assurance of repayment as the Secretary may require. The proposed collateral for a loan must be of such a nature that, when considered with the integrity and ability of the management, and the applicant's past and prospective earnings, repayment of the loan will be reasonably assured.

#### § 250.13 Books, records, and reports.

The Secretary shall have the right to inspect such books and records of the applicant as the Secretary may deem necessary and to request periodic reports.

#### § 250.14 Insurance required.

(a) If insurance of any type is required on property under the terms of a loan authorization or mortgage it must be in a form approved by the Secretary and obtained from an underwriter satisfactory to the Secretary and meeting at least one of the following requirements:

(1) An underwriter licensed by an insurance regulatory agency of a State to write the particular form of insurance being written.

(2) A foreign insurance company or club operating in the United States that has deposited funds in an amount and manner satisfactory to the Secretary in a bank chartered under the laws of a State or the United States of America, or in a trust fund satisfactory to the Secretary, which funds are solely for the payment of insurance claims of United States vessels.

(3) A reciprocal or interinsurance exchange licensed by an insurance regulatory agency of a State to write the particular form of insurance being written.

(4) An insurance pool composed entirely of owners and operators of fishing vessels.

(b) Any underwriter (including a company, club, or pool) writing such insurance shall furnish such reasonable financial or operating data as the Secre-

tary may require to determine the standing and responsibility of said underwriter.

#### § 250.15 Penalties on default.

Unless otherwise provided in the loan documents, failure on the part of a borrower to conform to the terms of the loan documents will be deemed grounds upon which the Secretary may cause any one or all of the following steps to be taken:

(a) Discontinue any further disbursements of funds contemplated by the loan documents.

(b) Take possession of any or all collateral given as security and the property purchased with borrowed funds.

(c) Prosecute legal action against the borrower.

(d) Declare the entire amount of the loan immediately due and payable.

DONALD L. MCKENNA,  
Director, Bureau of  
Commercial Fisheries.

AUGUST 6, 1965.

\* \* \* \* \*

### HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Wallace J. Boudreaux, Brownsville, Tex., applied for a fishing vessel construction differential subsidy to aid in the construction of an 82-foot overall steel vessel to engage in the fishery for shrimp (including royal-red shrimp), Atlantic tuna, snapper, and spiny lobster. Hearing was held. The U. S. Bureau of Commercial Fisheries published the notice of the application and hearing in the Federal Register, August 6, 1965.

American Stern Trawlers, Inc., New York, N. Y., applied for a fishing vessel construction differential subsidy to aid in the construction of a steel vessel with a length between perpendiculars of 262 feet to engage in the fishery for groundfish and whiting. Hearing was held September 14, 1965.

Mussel, Inc., New Bedford, Mass., applied for a fishing vessel construction differential subsidy to aid in the construction of an 88-foot overall steel vessel to engage in the fishery for groundfish, lobster, swordfish, flounder, and scallops. Hearing was held September 16, 1965.

The Bureau published the notice of the applications and hearings in the Federal Register, August 12, 1965.

Applications for fishing vessel construction differential subsidies to aid in the construction of 86-foot overall steel vessels were

received from two more firms in Brownsville, Tex.: Tatum Fisheries, Inc. (hearing held September 30, 1965), and Texas Fisheries, Inc. (hearing held October 5, 1965.)

Each of those firms applied separately for a subsidy to build its own vessel to engage in the fishery for shrimp (including royal-red shrimp), spiny lobster, Atlantic tuna, swordfish, snappers, and grouper.

Another application was received from Boat Jupiter, Inc., New Bedford, Mass. (hearing held September 28, 1965), for a fishing vessel construction differential subsidy to aid in the construction of a 90-foot overall wooden vessel to engage in the fishery for scallops, groundfish, flounder, and lobster.

The Bureau published the notice of the applications and hearings in the Federal Register, August 13, 1965. Hearings on the economic aspects of the applications were held.

Note: See Commercial Fisheries Review, August 1965 p. 100.



### Department of Labor

WAGE AND HOUR AND PUBLIC CONTRACTS DIVISIONS

#### HEARINGS HELD ON INDUSTRY WAGE RATES IN AMERICAN SAMOA:

A special Industry Committee appointed by the Secretary of Labor to review minimum wage rates under the Fair Labor Standards

Act for American Samoan industries completed in July 1965 its public hearings in Pago Pago, American Samoa. Tuna canneries there were included in the hearings since the minimum wage for tuna cannery workers in American Samoa is less than the mainland minimum wage. The committee did not recommend any change at this time in the present minimum wage rate of \$1.00 an hour for workers engaged in fish canning and processing. No change was recommended for the minimum wage rates in other industries except the petroleum marketing industry.

The Fair Labor Standards Act authorizes industry committees to recommend minimum wage rates for American Samoan industries at or below the statutory minimums that apply on the mainland. Composed of residents of both American Samoa and the continental United States, the committees are equally representative of employees, employers, and the public.

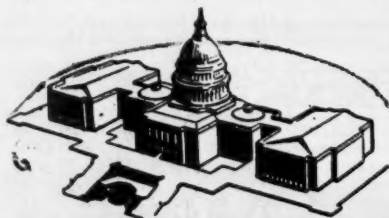
The recommendations of the Industry Committee on industries in American Samoa were published in the *Federal Register*, August 7, 1965, and became effective August 23, 1965.

Notes: (1) See *Commercial Fisheries Review*, July 1965 p. 103.  
(2) Copies of the wage order, the Committee's Report, Findings of Fact and Recommendations, are available from offices of the U. S. Labor Department's Wage and Hour Contracts Divisions, Washington, D. C.



## Eighty-Ninth Congress (First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and



allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

**ALASKAN ECONOMY:** Sen. Bartlett inserted in *Congressional Record* (pp. 20878-20882), Aug. 25, 1965, a report on the Alaskan economy of 1964, published by the Institute of Business, Economic and Government Research of the University of Alaska. One section discusses Alaska's fisheries industry.

**ANADROMOUS FISH CONSERVATION:** Subcommittee on Fisheries and Wildlife Conservation of House Committee on Merchant Marine and Fisheries Aug. 19, 1965, met and ordered reported favorably to the full Committee H. R. 23 (amended), to authorize the Secretary of the Interior to initiate a program for the conservation, development, and enhancement of the Nation's anadromous fish in cooperation with the several States.

House Committee on Merchant Marine and Fisheries Sept. 8, 1965, ordered bill reported favorably to the House.

**ANTIDUMPING ACT AMENDMENT:** H. R. 10619 (Fulton of Pa.) introduced in House Aug. 24, 1965, to amend the Antidumping Act, 1921; to Committee on Ways and Means.

**CHESAPEAKE BAY OYSTER PRODUCTION:** Sen. Tydings *Congressional Record*, Sept. 1, 1965 (pp. 21755-21756) spoke in the Senate concerning the decline of oyster production in the Chesapeake Bay. He inserted this article by Leonard Dowie, Jr., which appeared in the Aug. 15 *Washington Post*: "Maryland Better Clam Up About Her Oysters." The article tells of the natural and manmade problems--mud erosion, hurricanes, and premature harvesting--which have beset the bay for many years.

**ECOLOGICAL RESEARCH AND SURVEY:** H. R. 10766 (Ottinger), Aug. 31, 1965, introduced in House, to authorize the Secretary of the Interior to conduct a program of research, study and surveys, documentation, and description of the natural environmental systems of the United States for the purpose of understanding and evaluating the condition of these systems and to provide information to those concerned with natural resources management, and for other purposes; to Committee on Interior and Insular Affairs. Includes a section authorizing participation in environmental research in surrounding oceans in cooperation with other countries or with international organizations.

**FACTORY FISHING VESSELS:** Rep. Tupper (Maine) in extension of remarks in *Congressional Record* (pp. 21020-21021), Aug. 25, 1965, expressed hope that all members will study H. R. 10215. Bill would empower the Secretary of the Interior to take appropriate action to construct and outfit three factoryships of the most advanced design and with the latest gear and equipment, and authorize the Secretary to lease each vessel to the highest responsible bidder for a term of not more than 1 years. Bidders must be U. S. citizens or U. S. firms. He further states that "there are two principal things we must do to help the fishing industry in the United States: first, we must increase the demand for fish and fish products in the United States, and second, we must rebuild our U. S. fishing fleet." In order to accomplish these basic purposes, he stated, we must improve the quality of fish and fish products both before it gets to the marketplace and also in the nation's restaurants; and we must eliminate the disagreement and bickering in the fishing industry itself so as not to impede the rebuilding of our U. S. fishing fleet.

**FISHERMEN'S ORGANIZATION AND COLLECTIVE BARGAINING:** Subcommittee on Merchant Marine and Fisheries of Senate Committee on Commerce, Aug. 5, 1965, held and concluded hearings on S. 1054, assuring bargaining rights of fishermen's organizations in the ex-vessel sale of fish on which the livelihood of their members depends. Testimony received from Donald L. McKernan, Bureau of Commercial Fisheries, Department of the Interior.

**FISH FARMING:** H. R. 10626 (Mills) introduced in House Aug. 24, 1965, to amend the Consolidated Farmers Home Administration Act of 1961 in order to increase the amount for which loans may be made under such for fish farming; to Committee on Agriculture.

**FOOD IRRADIATION PROGRAM:** Rep. Price inserted in Congressional Record (p. A4709), Aug. 23, 1965, an article which appeared in the Washington, D. C., Evening Star, Aug. 15, 1965, entitled "Irradiated Foods for Tomorrow's Dinners."

**FOOD MARKETING NATIONAL COMMISSION:** Sen. Hart (Congressional Record, Aug. 5, 1965, pp. 18827-18828) inserted the interim report of the National Commission on Food Marketing which was filed on July 1, 1965, summarizing the work accomplished since its establishment last summer and indicating the areas that will be explored in the year ahead.

**FOREIGN AID AND FISHERIES JURISDICTION:** The Committee on Conference on the disagreeing votes of the two Houses on the amendment of the Senate to the bill H. R. 7750, the proposed Foreign Assistance Act of 1965, submitted Aug. 18, 1965, a conference report (H. Rept. No. 811). An excerpt from the conference report concerning harassment of U. S. fishing vessels follows: "The Senate amendment added a new subsection 620(o) to the act under which no assistance could be furnished under the act to any country which (1) has extended, or hereafter extends, its jurisdiction for fishing purposes over any area of the high seas beyond that recognized by the United States, and (2) hereafter imposes any penalty or sanction against any U. S. fishing vessel on account of its fishing activities in such an area. The amendment did not apply to extensions of jurisdiction pursuant to international agreement to which the United States is a party."

"The House bill did not contain a comparable provision.

"The managers on the part of the House agreed to a compromise which eliminates the rigid prohibitions against supplying U. S. Assistance\*\*\* but requires that consideration be given to the behavior of recipients of our aid with respect to these problems in determining the nature and amount of aid to be provided. Language was accepted, indicating that consideration should be given to excluding from U. S. assistance any country which imposes any penalty or sanction against any U. S. fishing vessel on account of its fishing activities in international waters rather than a requirement that aid be terminated under such circumstances.

"The managers on the part of the House agreed that the United States should give consideration to the treatment of U. S. fishing vessels by foreign governments in determining the nature and amount of U. S. assistance made available to such governments. At the same time, they recognized that a complete prohibition of aid to governments interfering with U. S. vessels might in certain instances prevent the attainment of U. S. foreign

policy objectives and adversely affect the entire program of the Alliance for Progress."

Chapter I of Part III of the Foreign Assistance Act of 1961, as amended, which relates to general provisions would be amended by adding a new subsection 620(o) as follows:

"In determining whether or not to furnish assistance under this Act, consideration shall be given to excluding from such assistance any country which hereafter seizes, or imposes any penalty or sanction against, any United States fishing vessel on account of its fishing activities in international waters. The provisions of this subsection shall not be applicable in any case governed by international agreement to which the United States is a party."

House Aug. 19, 1965, called up, considered, and adopted conference report (H. Rept. No. 811) on H. R. 7750. Adopted conference report language for curtailment of foreign aid to countries harassing U. S. vessels fishing in offshore waters. Senate Aug. 24, 1965, adopted conference report on H. R. 7750. These actions cleared bill for the President's signature.

H. R. 7750, authorizing funds for foreign aid for fiscal year 1966, was signed by the President Sept. 6, 1965 (P. L. 89-171). Retains language curtailing foreign aid to countries harassing U. S. vessels fishing in offshore waters.

**HALIBUT COMMISSION:** Subcommittee on Fisheries and Wildlife Conservation of House Committee on Merchant Marine and Fisheries Aug. 19, 1965, reported favorably to the full committee H. R. 9734, to amend the Northern Pacific Halibut Act in order to provide certain facilities for the International Pacific Halibut Commission.

The Department of the Interior recommended enactment of this bill to provide a headquarters office and laboratory facilities for the International Pacific Halibut Commission at the University of Washington. In a letter to the House Merchant Marine and Fisheries Committee, the Deputy Assistant Secretary of the Interior for Fish and Wildlife, and Parks said the Department approves H. R. 9734 which would amend the Northern Pacific Halibut Act by authorizing the Secretary of State to provide the facilities on or near the University campus. The Commission now occupies space on the campus, but its use will terminate in the fall of 1966. The proposed facilities would provide approximately 12,000 square feet of floor space at an estimated cost of \$500,000.

House Committee on Merchant Marine and Fisheries Sept. 8, 1965, ordered bill favorably reported to the House.

**HEALTH, EDUCATION, AND WELFARE APPROPRIATIONS, FY 1966:** S. Rept. 537, Departments of Labor and Health, Education, and Welfare, and Related Agencies Appropriation Bill, 1966 (Aug. 3, 1965, report from the Committee on Appropriations, U. S. Senate, 89th Congress, 1st session, to accompany H. R. 7765), 95 pp., printed. Committee reported the bill to the Senate with various amendments. Under the Public Health Service, Committee added planning funds for an addition to the Narragansett Shellfish Laboratory in Rhode Island and additional funds for the Federal water pollution control program.

Senate Aug. 5, 1965, passed after adoption of all committee amendments en bloc (which were thereafter con-



sidered as original text for purpose of further amendment) H. R. 7765, fiscal 1966 appropriations for the Departments of Labor, and Health, Education, and Welfare, and related agencies. Includes funds for botulism research under the Food and Drug Administration; water pollution control under Office of the Secretary; pesticide activities, water supply and water pollution control, shellfish sanitation program, and botulism under the Public Health Service. Same day Senate asked for a conference. House Aug. 11, 1965, disagreed to Senate amendments, agreed to a conference requested by the Senate, and appointed conferees.

Committee of Conference submitted to House Aug. 12, 1965, conference report (H. Rept. 791) on H. R. 7765. House Aug. 16 and Senate Aug. 17, 1965, adopted the conference report.

H. R. 7765 was signed by the President Aug. 31, 1965 (P. L. 89-156).

**INLAND GREAT LAKES AND WESTERN RIVERS RULE FOR SMALL VESSELS:** Senate Committee on Commerce, Sept. 2, 1965, reported (S. Rept. 675) on S. 1349, to amend the inland Great Lakes, and western Rivers rules concerning sailing vessels and vessels under 65 feet in length. Senate Sept. 8, 1965, passed without amendment and cleared bill for the House.

House Sept. 9, 1965, referred Senate-passed S. 1349 to Committee on Merchant Marine and Fisheries.

**LIENS FOR LEASED VESSEL EQUIPMENT:** Introduced in Senate Aug. 25, 1965, S. 2454 (Kennedy of Mass.) and introduced in House Sept. 1, 1965, H. R. 10829 (O'Neill of Mass.), to authorize liens of value of secured equipment used solely for navigation or fishing on a vessel of the United States and to permit the recording of such liens; to Committee on Commerce and Committee on Merchant Marine and Fisheries, respectively. Sen. Kennedy in the Senate pointed out (Congressional Record, p. 20852, Aug. 25, 1965) that bill would seek to insure protection to suppliers who provide equipment to the fishing industry under such forms of security as leases, conditional sales contracts, chattel mortgages, and other means, thus helping the fishing industry improve its condition and expand its operations. He states: "...some of these suppliers in Massachusetts have indicated to me that there is a growing reluctance to furnish this equipment because they have not been permitted to record with the Collector of Customs any notice of their claim and description of their security. In certain instances, the suppliers have lost title to their equipment because their security was not known to other lienors."

**METRIC SYSTEM:** H. R. 10329 (Miller) introduced in House Aug. 9, 1965, to provide that the Secretary of Commerce shall conduct a program of investigation, research, and survey to determine the practicability of the adoption by the United States of the metric system of weights and measures; to Committee on Science and Astronautics.

House Committee on Science and Astronautics, Aug. 10, 1965, met in executive session and ordered reported favorably H. R. 10329 (a clean bill introduced). House Committee Aug. 24, 1965, reported (H. Rept. 850) on H. R. 10329; referred to Committee of the Whole House on the State of the Union.

H. Rept. 850, Providing for the Secretary of Commerce to Conduct a Program of Investigation, Research,

and Survey of the Metric System in the United States (Aug. 24, 1965, report from the Committee on Science and Astronautics, House of Representatives, 89th Congress, 1st session, to accompany H. R. 10329), 7 pp., printed. Committee reported bill favorably without amendment. Discusses purpose, committee recommendations, cost and budget data, and department recommendations. House Committee on Rules Sept. 9 deferred action on bill.

**MINIMUM WAGE:** Introduced in House Aug. 4, 1965, H. R. 10275 (Roosevelt), the proposed Fair Labor Standards Amendments of 1965; to Committee on Education and Labor. Would require all employee commercial fishermen to be paid the required minimum hourly wage rate during any workweek. Since this would be newly covered employment, the required minimum wage would be not less than \$1.00 per hour beginning Jan. 1, 1966; not less than \$1.15 per hour beginning July 1, 1967; not less than \$1.40 per hour beginning July 1, 1968; not less than \$1.60 per hour beginning July 1, 1969; and not less than \$1.75 per hour beginning July 1, 1970. For shoreworkers in the industry the bill proposes to raise the minimum wage rate to not less than \$1.40 per hour beginning July 1, 1966; not less than \$1.60 per hour beginning July 1, 1967; and not less than \$1.75 per hour beginning July 1, 1968. Piece work or other bases of wage computation must work out to the hourly rates prescribed. Bill continues the present exemption from overtime pay requirements for the fishing industry, including on-shore operations.

House Committee on Education and Labor met Aug. 10, 1965, on H. R. 10275; no announcements were made. Same Committee Aug. 17, 1965, approved bill for reporting to the House, but a clean bill (H. R. 10518) was introduced.

H. R. 10518 (Roosevelt) introduced in House Aug. 17, 1965, to amend the Fair Labor Standards Act of 1938 to extend its protection to additional employees, to raise the minimum wage, and for other purposes; to Committee on Education and Labor.

On Aug. 18, 1965, Committee ordered reported favorably to House H. R. 10518; the reference to fishery employees, as contained in the earlier version (H. R. 10275) was omitted. At this stage, then, it appeared that the amendments to the Fair Labor Standards Act will make no change affecting any element of the commercial fishing industry.

The Committee version of H. R. 10275, which is H. R. 10518, as reported out by the Committee does not propose any changes in the present fishery exemptions under the Fair Labor Standards Act. (The Subcommittee had proposed the repeal of the minimum wage exemptions for offshore fishery employees under H. R. 10275). But the bill still provides for an increase in the present minimum wage for covered employees as per the previous bill. Also provides a three-step increase over the present level for employees in Puerto Rico--an increase of 12 percent within 60 days after July 1, 1966; 16 percent at the end of the first year; and 12 percent at the end of the second year.

Committee reported (H. Rept. 871) to the House Aug. 25, H. R. 10518. H. Res. 546 (Powell) introduced in House Aug. 25, provides for consideration of H. R. 10518; to Committee on Rules.

**NATIONAL SEA GRANT COLLEGES AND PROGRAM ACT OF 1965:** S. 2439 (Pell) introduced in Senate Aug.

19, 1965, to amend the National Science Foundation Act of 1950, as amended, so as to authorize the establishment and operation of sea grant colleges and programs by initiating and supporting programs of education, training, and research in the marine sciences and a program of advisory services relating to activities in the marine sciences, to facilitate the use of the submerged lands of the Outer Continental Shelf by participants carrying out these programs, and for other purposes; to Committee on Labor and Public Welfare, Sen. Pell in *Congressional Record* (pp. 20380-20382), Aug. 19, 1965, pointed out that the bill would provide for the establishment and development of national sea grant colleges and an educational program geared to the beneficial use of our vast marine resources. The short title of this bill is the National Sea Grant Colleges and Program Act of 1965. Would provide for a greatly increased educational program in the practical side of oceanography, aquaculture, marine mining, and related fields. It would also expand research leading to results of a direct and practical nature, of immediate value to those working in the marine sciences. Finally, it would create an extension service to spread useful information regarding the exploitation of the immense marine resources available to this Nation.

**NATURAL RESOURCES DEPARTMENT:** S. 2435 (Moss and 2 others) introduced in Senate Aug. 19, 1965, to redesignate the Department of the Interior as the Department of Natural Resources and to transfer certain agencies to and from such department; to Committee on Government Operations. Sen. Moss in *Congressional Record* (pp. 20378-20380), Aug. 19, 1965, pointed out that the bill provides for a Secretary of Natural Resources and a Deputy Secretary. Provides for two Under Secretaries—one for water and power, and one for lands and forests. Responsibility of the Under Secretary for Lands and Forests would be divided into three branches, each headed by an Assistant Secretary—the National Park Service, the Fish and Wildlife Service, and the Bureau of Outdoor Recreation could report to an Assistant Secretary for Recreation and Wildlife.

Sen. Moss (*Congressional Record*, Sept. 1, 1965, pp. 21744-21748) spoke in the Senate concerning the comments which his bill (S. 2435) has received. He inserted an analysis of the bill which appeared in the Aug. 25, 1965, *Deseret News* of Salt Lake City, Utah, entitled "Make Our Resources Count." He also inserted three proposals on reorganization of the water resource development activities of the Federal Government as background and discussion material—"The Case for a Department of Natural Resources," University of New Mexico School of Law, Nov. 1961; position paper, "Reorganization of Federal Natural Resource Agencies"; and "A Basic Reorganization for Both Efficiency and Improved Resource Conservation: Consolidation of Agricultural, Natural Resource and Rural Program Agencies."

**NORTH PACIFIC FISHERIES TREATY:** Rep. Pelly inserted in *Congressional Record* (pp. A4627-4628), Aug. 18, 1965, copy of resolution: "Washington State Labor Council Boycott of Japanese Imports, Resolution No. 34, Aug. 12, 1965." Council, which represents 95 percent of all organized labor in the State of Washington, urges immediate Federal legislation to protect North American stocks of salmon and promised a complete boycott of Japanese imports if Japan fails to abide by conservation principles relating to those fish.

Rep. Pelly pointed out in *Congressional Record* (pp. A4632-A4633), Aug. 18, 1965, that the success of some of the 1965 Bristol Bay salmon runs in Alaska does not

represent in any way that a solution to the North Pacific salmon problem has been found.

Sen. Gruening inserted in *Congressional Record* (pp. 20493-20495), Aug. 23, 1965, an article which appeared in the *New York Times*, Aug. 19, 1965, entitled "The Salmon is King to Cannermen (and Cooks) in the Alaskan Wilderness." He also inserted a second article entitled "Best Cooks in Alaska: The Hospitable Norse."

**OCEANOGRAPHIC AGENCY OR COUNCIL:** *National Oceanographic Council:* Hearings before the Committee on Commerce, United States Senate, 89th Congress, 1st session on S. 944, a bill to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes; Feb. 19, Mar. 16, and April 12, 1965; Serial 89-21, 194 pp., printed. Contents include statements and letters of various Federal officials, members of Congress, business firms, university and institute officials, and associations. Appendixes include these documents: "Preparation of Oceanographic Program," "National Oceanographic Data Center," "Potential Resources of the Ocean," and "Preliminary Plan for Expansion of Oceanographic Research, etc."

S. 944, to provide for expanded research and development in the marine environment of the United States, to establish a National Oceanographic Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering, and Resources, was reported (S. Rept. 528) with amendments by the Senate Committee on Commerce, July 29. The Committee completely revised the bill, substituting new and broader language for the original text. The title of the bill was amended. Would establish a National Council in Marine Resources and Development. The Vice President would be Chairman of the Council, and the members of the Council would include the Secretaries of Interior, State, Commerce, Health, Education, and Welfare, and the Navy, as well as the Chairman of the Atomic Energy Commission and the Director of the National Academy of Sciences. Function of the Council would be to advise and assist the President "with respect to the performance of Federal functions in the field of marine science and engineering, including, but not limited to the following functions: (1) survey all significant marine science activities, including the policies, plans, programs, and accomplishments of all departments and agencies of the United States engaged in such activities; (2) develop a comprehensive program of marine science activities, including, but not limited to, exploration, exploitation, and conservation of the resources of the marine environment, marine engineering studies of air-sea interaction, transmission of energy, and communications, to be conducted by departments and agencies of the United States; (3) designate and fix responsibility for the conduct of marine science activities by departments and agencies of the United States, including but not limited to, exploration, exploitation, and conservation of the resources of the marine environment, marine engineering, studies of air-sea interaction, transmission of energy, and communications; (4) provide for effective cooperation among all departments and agencies of the United States engaged in marine science activities, and specify, in any case in which primary responsibility for any category of the marine science activities has been assigned to any department or agency, which of those activities may be carried on concurrently by other departments or agencies; (5) resolve differences arising among departments and agencies . . . with respect to marine science activities under this Act . . .

(6) review annually all marine science activities conducted by departments and agencies of the United States . . . ; (7) undertake a comprehensive study of the legal problems arising out of the management, use, development, recovery, and control of the resources of the marine environment; and (8) establish long-range studies of the potential benefits to the United States economy, security, health, and welfare to be gained from marine resources, engineering, and science." In addition, the Council would be authorized to "coordinate a program of international cooperation in work done pursuant to this Act . . . . The revised bill would also set up a Commission on Marine Science, Engineering, and Resources, composed of 15 members representing government, industry, and scientific institutions. In addition to cooperating with the Council in the 8 areas listed above, the Commission would be directed to "survey the marine science activities of the United States, make recommendations for the most effective organizational structure for conduct of Federal activities in this area, and make recommendations for the encouragement of private investment in marine and resource development." Would authorize the appropriation of "such sums as may be necessary," with the provision that the appropriations would not exceed \$1 million for any given fiscal year. The provisions of the Act would expire on June 30, 1970.

S. Rept. 528, Marine Resources and Engineering Development Act of 1965 (July 29, 1965, report from the Committee on Commerce, U. S. Senate, 89th Congress, 1st session, to accompany S. 944), 17 pp., printed. Committee reported bill favorably with amendments. Presents committee amendment in the nature of a substitute; discusses purpose, background, need for legislation; the United States and the world ocean; a new continent--the Continental Shelf; resources of the marine environment; minerals of the deep-ocean floor; nuclear power for ocean research, mining and exploitation; agency comments.

Senate Aug. 5, 1965, passed with committee amendment (motion to reconsider tabled) S. 944. Committee amendment inserted in the Record.

House Aug. 9, 1965, received for concurrence Senate-passed S. 944; to Committee on Merchant Marine and Fisheries.

H. R. 10432 (Matsunaga) introduced in House Aug. 12, 1965, to provide for expanded research and development in the marine environment of the United States, to establish a National Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering and Resources, and for other purposes; to Committee on Merchant Marine and Fisheries.

Sen. Magnuson inserted in Congressional Record, (pp. 21404-21405), Aug. 30, 1965, this editorial published in the Seattle Times of August 23: "The Oceans' Importance." It points out the strong necessity for the Government to devote more attention to the correlation and coordination of a program of oceanography within the Government departments. Sen. Magnuson stated that he hopes action will be taken soon on the bill (S. 944) which he introduced along those lines.

Subcommittee on Oceanography of House Committee on Merchant Marine and Fisheries Sept. 8, 1965, ordered reported favorably to the full committee S. 944, with amendments.

H. R. 10979 (Gibbons) introduced in the House Sept. 9, 1965, to provide for expanded research and development in the marine environment of the United States, to establish a National Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering and Resources, and for other purposes; to Committee on Merchant Marine and Fisheries.

**OCEANOGRAPHY:** Committee Print, Abridged Chronology of Events Related to Federal Legislation for Oceanography 1956-65, 89th Congress, 1st session, prepared by the Library of Congress Legislative Reference Service, July 15, 1965 (Revised July 21, 1965), 30 pp., printed. Part I is a chronology, beginning with landmark events in 1956, that highlights legislatively significant action by both the President and the Congress; Part II contains explanatory notes which elucidate contents of the earlier list; Part III is a brief summary of Federal funding in oceanography, by agency and functional area; Part IV contains a summary of congressional action by the 86th, 87th, 88th, and 89th Congress related to oceanographic legislation; and Part V is a selected bibliography of those papers and articles bearing on elements of oceanography of legislative rather than scientific interest.

Subcommittee on Oceanography of House Committee on Merchant Marine and Fisheries Aug. 10-13, 1965, held a hearing on various bills relating to the National Oceanographic Program. Meeting continued Aug. 17, with testimony by Director, Bureau of Commercial Fisheries. Hearings concluded Aug. 19.

Rep. Keith, Congressional Record (p. A4750), Aug. 24, 1965, called attention to the dramatic contribution that Sea Lab II is making to our fund of useful knowledge on oceanography. He stated that a team of skin divers is preparing to swim down to the bottom of the Pacific Ocean to live in a house under the sea. The house is a 12- by 58-foot cylinder called Sea Lab II in which the aquanauts are able to work and sleep for up to 45 days at a depth of 210 feet. Among other things, the team will conduct studies of the forms of life and minerals on or near the sea floor.

Subcommittee on Oceanography of House Committee on Merchant Marine and Fisheries met in executive session Sept. 1, 1965, on pending legislation. No announcements were made.

**ORDERLY MARKETING ACT OF 1965:** Introduced in House Aug. 26, 1965, H. R. 10704 (Hathaway) and H. R. 10734 (Cleveland) Aug. 30, to provide for the orderly marketing of articles imported into the United States, to establish a flexible basis for the adjustment by the U. S. economy to expanded trade, and to afford foreign supplying nations a fair share of the growth or change in the U. S. market; to Committee on Ways and Means.

**PESTICIDES AND FISH AND WILDLIFE:** Subcommittee on Fisheries and Wildlife Conservation of House Committee on Merchant Marine and Fisheries Aug. 19, 1965, met and ordered reported favorably to the full committee S. 1623, to authorize such sums as may be necessary to carry out the continuing study by the Secretary of the Interior of the effects of insecticides, herbicides, fungicides, and other pesticides upon fish and wildlife. House Committee Sept. 8, 1965, ordered bill favorably reported to the House.

**SCIENCE AND TECHNOLOGY COMMISSION:** H. R. 10679 (Karth) introduced in House Aug. 25, 1965, for the

establishment of a Commission on Science and Technology; to Committee on Science and Astronautics.

**SHRIMP IMPORTS:** Rep. Thompson in Congressional Record (p. 19174) Aug. 10, 1965, inserted remarks of a fishery businessman at the Annual Meeting of the Shrimp Association of the Americas, Miami Beach, Fla., June 21, 1965. The businessman refers to the problem of marketing an ever-increasing supply of imported shrimp coming into the United States from 66 nations. He also pointed out that the United States and Mexican shrimp producers propose a solution to the marketing problem--an industrywide advertising program which would include foreign producers, importers, and domestic producers. Accordingly, the International Shrimp Council has been organized to gather funds from producers throughout the world on a sustained basis and to apply the funds to a substantial and well-conceived advertising program that will expand the market and increase consumption of shrimp from year to year. Included is a table showing U. S. imports of shrimp for various years, 1940-64.

**STATE DEPARTMENT APPROPRIATIONS FY 1966:** Subcommittee of Senate Committee on Appropriations, Aug. 9, 1965, in executive session, marked up and approved for full committee consideration H. R. 8639, fiscal 1966 appropriations for the Departments of State, Justice, and Commerce, the Judiciary, and related agencies. Included under the State Department are funds for United States participation in various International Fisheries Commissions.

Senate Committee on Appropriations Aug. 10, 1965, ordered favorably reported with amendments H. R. 8639. The same day the Committee reported (S. Rept. 547) the bill to the Senate.

S. Rept. 547, Departments of State, Justice, and Commerce, the Judiciary, and Related Agencies Appropriation Bill, 1966 (Aug. 10, 1965, report from the Committee on Appropriations, U. S. Senate, 89th Congress, 1st session, to accompany H. R. 8639), 23 pp., printed. Committee reported favorably with various amendments. The Senate-passed bill would appropriate \$2,300,000 for the International Fisheries Commissions, restoring the \$275,000 cut by the House from the Department's budget request.

Bill passed Senate, amended, Aug. 12, 1965. Senate asked for a conference on same day.

House Aug. 16, 1965, disagreed to Senate amendments to H. R. 8639, agreed to conference requested by the Senate, and appointed conferees.

House and Senate conferees met Aug. 18, 1965, and conference report (H. Rept. 807) was filed the same day. Compromise as adopted by conferees appropriates \$2,125,000 for the International Fisheries Commissions, an increase of \$100,000 over the amount approved by the House, but \$175,000 less than the Department's budget request of \$2.3 million which had been approved by Senate.

House Aug. 19, 1965, called up, considered, and adopted conference report (H. Rept. 807) on H. R. 8639 (sent to the Senate by a voice vote). Senate Aug. 24, 1965, adopted conference report on H. R. 8639. These actions cleared bill for President's signature.

H. R. 8639 was signed by the President Sept. 2, 1965 (P. L. 89-164).

**TILLAMOOK BAY AND BAR, OREGON:** S. Doc. 43, Letter from the Secretary of the Army, transmitting a letter from the Chief of Engineers, Department of the Army, Dated June 2, 1965, Submitting a Report, Together with Accompanying Papers and Illustrations, on a Review of the Reports on Tillamook Bay and Bar, Oregon, requested by a Resolution of the Committee on Public Works, United States, Senate, Adopted Aug. 3, 1959; referred to Committee on Public Works, U. S. Senate, 89th Congress, 1st session, July 22, 1965, 143 pp., illus., printed. Contains favorable report from the Army Chief of Engineers, on a review of the reports on Tillamook Bay and Bar, Oregon. Besides the report of the district engineer (giving authority, description, estimate of annual charges, estimate of benefits), it contains comments from various Federal Agencies, State of Oregon, and reports from Chief of Engineers for Rivers and Harbors. One section of the report deals with fishing industry and commercial fishing activity. Several appendices appear, including jetty design and cost estimate, benefits, correspondence and exhibits.

**TRADE AGREEMENT DUTY REDUCTION:** S. 2403 (Javits) introduced in Senate Aug. 12, 1965, to authorize the President, in carrying out trade agreements with fully developed countries or areas, to reduce duties below the limitation set forth in section 201 (b) (1) of the Trade Expansion Act of 1962, and for other purposes; to Committee on Finance.

**TRADE EXPANSION ACT AMENDMENT:** Introduced in House, H. R. 10293 (Ashbrook) and H. R. 10295 (Collier) Aug. 5, 1965; H. R. 10475 (Bray) Aug. 16, to amend the Trade Expansion Act of 1962; to Committee on Ways and Means.

Rep. Reid in Congressional Record, Aug. 5, 1965 (pp. 18782-18783) pointed out that the Kennedy round should be modified now by legislation while there is yet time, to keep the tariff cuts within the bounds of reason; our industries need a clear outlook into the future as far as this can be achieved. H. R. 10237 introduced Aug. 3, would remove items that can qualify under one or more of the criteria from the Kennedy round (that is, the President's list for a 50-percent tariff reduction); provide for establishment of import quotas if a product met the criteria laid down (such quotas would hold imports at the average level of the past 3 years but would permit annual increases thereafter in the same proportion as the increase in domestic consumption); represent an equitable sharing of the market.

**TRAWLERS FROM POLAND:** Sen. Brewster in Congressional Record (pp. 18824-18825) Aug. 5, 1965, discussed the proposal of the Department of the Interior to purchase two modern fishing trawlers from Poland.

Subcommittee on Merchant Marine and Fisheries of Senate Committee on Commerce, Aug. 11, 1965, held hearings on proposed construction of two stern ramp fishing trawlers in Poland with counterpart funds for operation in American waters.

**TORT CLAIMS AGAINST U. S. BY COMMERCIAL FISHING VESSELS:** H. R. 10308 (Tupper) introduced in House Aug. 5, 1965, to amend the tort claims procedure of title 28, United States Code, to permit actions for damages against the United States by or on behalf of officers and crews of American commercial fishing vessels who are injured or killed at sea by an instrumentality of war; to Committee on the Judiciary.



**VESSEL MEASUREMENT:** Subcommittee on Merchant Marine and Fisheries of Senate Committee on Commerce held hearings Aug. 6, 1965, on S. 2142, to simplify the admeasurement of small vessels. Senate Committee Sept. 2, 1965, reported (S. Rept. No. 677) on S. 2142.

Senate Sept. 8, 1965, passed bill with amendment and cleared it for House.

House Sept. 9, 1965, referred Senate-passed S. 2142 to Committee on Merchant Marine and Fisheries.

**WATER POLLUTION CONTROL ADMINISTRATION:** S. 2481 (Ribicoff) introduced in Senate Aug. 31, 1965, to amend the Federal Water Pollution Control Act, as amended, to increase the share of Federal financial

assistance for construction of municipal sewage treatment works and to authorize increased appropriations for the purpose of making such grants, and for other purposes; to Committee on Public Works.

**WATER RESOURCES PLANNING ACT AMENDMENT:** S. 2445 (Javits) introduced in Senate Aug. 24, 1965, to amend the Water Resources Planning Act to accelerate and increase financial assistance to the States for such planning; to Committee on Interior and Insular Affairs. Sen. Javits in Congressional Record (pp. 20659-20660), Aug. 24, 1965, spoke from the floor of the Senate and stated that this legislation would amend the Water Resources Planning Act of 1965 (Public Law 89-80) by making the grants program effective immediately and by doubling the amount of funds authorized.



### SHRIMP-STUFFED MUSHROOM APPETIZERS

Appetizers should stimulate the appetite for the foods to follow. Appetizers should be choice morsels, prepared and served with care, for the first course is the indicator of things to come. Shrimp are America's most popular appetizer. But shrimp deserve a delicate sauce which heightens, not masks, their delicate flavor. A true connoisseur might prepare a shrimp appetizer in the manner described below--baked shrimp-stuffed mushroom caps, topped with whole shrimp, served with a delicate Mornay Sauce.

#### SHRIMP-STUFFED MUSHROOMS

- |   |  |
|---|--|
| 1-1/2 pounds shelled and deveined small shrimp, fresh or frozen | 1 tablespoon lemon juice                   |
| 16 large mushroom caps  | 1 tablespoon grated onion                  |
| 1 egg, beaten   | 1 tablespoon chopped parsley               |
| 2 tablespoons milk  | Salt and pepper                            |
| 1/4 cup dry bread crumbs  | Melted butter or margarine (about 1/4 cup) |



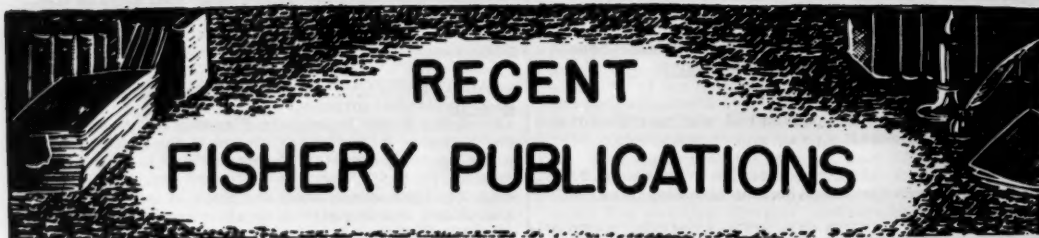
Shrimp-stuffed mushrooms with Mornay Sauce

Cook shrimp in boiling salted water to cover. Drain, then chill. Wash mushrooms and remove stems. Trim ends from mushroom stems and chop. Chop shrimp, reserving 16 whole shrimp for garnishing. Combine chopped shrimp, chopped mushroom stems, bread crumbs, egg, milk, lemon juice, onion, and parsley. Season to taste with salt and pepper. Spoon into hollows of mushroom caps. Top each mushroom cap with a reserved whole shrimp. Brush liberally with melted butter or margarine. Arrange in greased baking pan and bake in moderate oven (375 degrees) for 15 minutes or until mushrooms are tender. Serve with Mornay Sauce. Makes 4 main-dish servings; 8 appetizer servings.

#### MORNAY SAUCE

- |                                  |                               |
|----------------------------------|-------------------------------|
| 1 tablespoon butter or margarine | Dash onion salt               |
| 1 tablespoon flour               | 1/4 cup grated Cheddar cheese |
| 1 cup milk                       | Salt                          |
|                                  | Cayenne pepper                |

Melt butter or margarine, stir in flour to make a smooth paste. Gradually add milk, stirring, and cook over low heat until thickened and smooth. Add grated cheese and season to taste with salt and cayenne pepper. Heat 1 minute longer. Makes 1 1/4 cups sauce. (J. Walter Thompson Company and Shrimp Association of the Americas.)



## FISH AND WILDLIFE SERVICE PUBLICATIONS

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FL - FISHERY LEAFLETS.  
MNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.  
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.  
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.

- | Number   | Title  |
|----------|--|
| CFS-3772 | - Frozen Fishery Products, 1964 Annual Summary, 14 pp.                 |
| CFS-3789 | - Fish Meal and Oil, 1964 Annual Summary, 4 pp.                        |
| CFS-3810 | - Fish Sticks, Portions, and Breaded Shrimp, January-March 1965, 3 pp. |
| CFS-3816 | - Virginia Landings, 1964 Annual Summary, 11 pp.                       |
| CFS-3818 | - North Carolina Landings, 1964 Annual Summary, 10 pp.                 |
| CFS-3821 | - Alabama Landings, 1964 Annual Summary, 6 pp.                         |
| CFS-3824 | - Texas Landings, March 1965, 2 pp.                                    |
| CFS-3826 | - Mississippi Landings, 1964 Annual Summary, 7 pp.                     |
| CFS-3828 | - Frozen Fishery Products, May 1965, 8 pp.                             |
| CFS-3830 | - Alabama Landings, January 1965, 2 pp.                                |
| CFS-3831 | - Mississippi Landings, January 1965, 2 pp.                            |
| CFS-3832 | - Georgia Landings, January 1965, 2 pp.                                |
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| CFS-3837 | - Alabama Landings, February 1965, 3 pp.                               |
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| CFS-3839 | - Mississippi Landings, February 1965, 2 pp.                           |
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| CFS-3842 | - Louisiana Landings, March 1965, 3 pp.                                |
| CFS-3843 | - Louisiana Landings, April 1965, 3 pp.                                |
| CFS-3844 | - Alabama Landings, March 1965, 3 pp.                                  |
| CFS-3845 | - Mississippi Landings, March 1965, 2 pp.                              |
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| CFS-3851 | - South Carolina Landings, April 1965, 2 pp.                           |

- CFS-3852 - Michigan, Ohio & Wisconsin Landings, 1964 Annual Summary, 5 pp.  
CFS-3853 - Michigan, Ohio & Wisconsin Landings, January 1965, 3 pp.  
CFS-3854 - Michigan, Ohio & Wisconsin Landings, February 1965, 3 pp.  
CFS-3856 - Florida Landings, May 1965, 8 pp.  
CFS-3857 - Maine Landings, April 1965, 4 pp.  
CFS-3858 - Fish Meal and Oil, May 1965, 2 pp.  
CFS-3859 - South Carolina Landings, May 1965, 2 pp.  
CFS-3861 - Georgia Landings, May 1965, 2 pp.  
CFS-3862 - Rhode Island Landings, February 1965, 3 pp.  
CFS-3863 - Alabama Landings, May 1965, 3 pp.  
CFS-3864 - Shrimp Landings, January 1965, 5 pp.  
CFS-3868 - Maryland Landings, March 1965, 3 pp.  
CFS-3870 - Middle Atlantic Fisheries, 1964 Annual Summary, 8 pp.  
CFS-3875 - Maine Landings, May 1965, 4 pp.

### Wholesale Dealers in Fishery Products (Revised):

- SL- 2 - New Hampshire, 1964, 1 p.  
SL- 3 - Massachusetts, 1964, 11 pp.  
SL- 4 - Rhode Island, 1964, 2 pp.  
SL- 5 - Connecticut, 1964, 1 p.  
SL- 6 - New York Coastal Area, 1964, 10 pp.  
SL- 7 - New Jersey, 1964, 4 pp.  
SL- 8 - Pennsylvania, 1964, 3 pp.  
SL- 9 - Delaware, 1964, 1 p.  
SL- 11 - Washington, D. C., 1964, 1 p.  
SL- 21 - California, 1964, 9 pp.  
SL- 29 - Ohio (Great Lakes Area), 1964, 2 pp.  
SL- 30 - Pennsylvania (Great Lakes Area), 1964, 1 p.  
SL- 31 - New York (Great Lakes Area), 1964, 2 pp.  
SL- 33 - North Dakota (Mississippi River and Tributaries), 1964, 1 p.  
SL- 39 - Tennessee (Mississippi River and Tributaries), 1964, 2 pp.  
SL- 40 - Oklahoma (Mississippi River and Tributaries), 1964, 1 p.  
SL- 43 - Alabama (Mississippi River and Tributaries), 1964, 1 p.  
SL- 44 - Nebraska (Mississippi River and Tributaries), 1964, 1 p.  
SL- 45 - Mississippi (Mississippi River and Tributaries), 1964, 1 p.  
SL- 46 - Texas (Mississippi River and Tributaries), 1964, 2 pp.  
SL- 49 - South Dakota (Mississippi River and Tributaries), 1964, 1 p.  
SL-151 - Firms Manufacturing Marine Animal Scrap, Meal, Oil, Solubles and Homogenized Condensed Fish, 1963 (Revised), 8 pp.  
SL-161 - Producers of Packaged Fish, 1963 (Revised), 8 pp.

Sep. No. 741 - Bottom Trawling Surveys of the North-eastern Gulf of Alaska (Summer and Fall of 1961 and Spring of 1962).

FL-577 - Haul Seining in the Great Lakes, by William G. Gordon, 18 pp., illus., May 1965. Presents methods of construction and operation that are practical in the present haul seine fishery of the Great Lakes. Covers materials used and details of construction of seines, care and treatment of them, seining equipment, and fishing grounds and procedures. Illustrative diagrams and photographs aid in easy understanding.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE FISHERY MARKET NEWS SERVICE, U. S. BUREAU OF COMMERCIAL FISHERIES, RM. 510, 1815 N. FORT MYER DR., ARLINGTON, VA. 22209.

Number	Title
MNL-11	Fishing Industry in Spain, 1964, 7 pp.
MNL-22	(Supplement) Republic of South Africa and South West Africa Fisheries, 1964, 12 pp.
MNL-38	Developing the Costa Rican Fish Industry, 14 pp.
MNL-44	Iceland's Fishing Industry, 1964, 30 pp.
MNL-48	Pakistan's Fisheries Statistical Report, 1964, 20 pp.
MNL-75	Argentina's Fishing Industry, 1964, 8 pp.
MNL-81	France's Fishing Industry, 1964, 12 pp.

THE FOLLOWING REPRINTS FROM FISHERY BULLETIN, VOL. 63, NO. 3, 1964, ARE AVAILABLE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20240.

Age, Growth, Sex Ratio, and Maturity of the Whitefish in Central Green Bay and Adjacent Waters of Lake Michigan, by Donald Mraz, pp. 619-634, illus.,

Annotated Bibliography on Biology of Menhaden and Menhadenlike Fishes of the World, pp. 531-549.

A Critical Study of Pribilof Fur Seal Population Estimates, pp. 657-669.

Feeding and Growth of Juvenile Softshell Clams, MYA ARENARIA, pp. 635-642, illus.

Life History of Lake Herring in Lake Superior, pp. 493-530.

Meristic Variation in the Hexagrammid Fishes, pp. 589-609, illus.,

A Method of Measuring Mortality of Pink Salmon Eggs and Larvae, pp. 575-588, illus.

Movements, Growth and Rate of Recapture of Whitefish Tagged in the Apostle Islands Area of Lake Superior, pp. 611-618.

Ocean Mortality and Maturity Schedules of Karluk River Sockeye Salmon and Some Comparisons of Marine Growth and Mortality Rates, pp. 551-574, illus.

AVAILABLE FROM THE BRANCH OF REPORTS, U. S. BUREAU OF COMMERCIAL FISHERIES, 2725 MONTLAKE BLVD. E., SEATTLE, WASH. 98102.

FOLLOWING REPRINTS FROM FISHERY INDUSTRIAL RESEARCH, VOL. 2, NO. 3, 1964.:

Cholesterol Content of Various Species of Shellfish. 1--Method of Analysis and Preliminary Survey of Variables, by Mary H. Thompson, pp. 11-15.

Comparison of Chemical and Sensory Tests for Assessing Storage Life of Iced Calico Scallops (PECTEN GIBBUS), by Melvin E. Waters, pp. 5-10.

Comparison of the Picric Acid Turbidity and Nessler Tests with Subjective Evaluations of Quality of Shrimp, pp. 53-56.

Economic Study of Sea Scallop Production in the United States and Canada, pp. 57-79.

Evaluation of the Micro-Diffusion Method for the Determination of Tertiary Volatile Base in Marine Products, by John Spinelli, pp. 17-19.

Free Liquid Content of Gulf Oysters and Suggested Change in Standards, by Arthur F. Novak, E. A. Fieger, and J. A. Liuzzo, p. 3.

Observations of the "Blueing" of King Crab, PARALITHODES CAMTSCHATICA, pp. 47-52.

Preparation of Chilled Meat from Atlantic Blue Crab, by David H. B. Ulmer, Jr., pp. 21-45.

FOLLOWING REPRINTS FROM FISHERY INDUSTRIAL RESEARCH, VOL. 2, NO. 4, MAY 1965.:

Drip Formation in Fish. 3--Composition of Drip from Defrosted Pacific Cod Fillets, by David Miyauchi, John Spinelli, and John A. Dassow, 6 pp.

Economic Aspects of the U. S. Albacore Fishing Industry, by E. A. Hale and D. B. Ferrel, 39 pp.

Frozen King Crab (PARALITHODES CAMTSCHATICA) Meat: Effect of Processing Conditions on Fluids Freed upon Thawing, by Jeff Collins and Russel L. Brown, 9 pp., illus.,

Technological Investigations of Pond-Reared Fish. 2--Extension of the Shelf Life of Buffalo Products Through Use of Antioxidants, 4 pp., illus., printed, April 1965.

Thiaminase Activity in Fish: An Improved Assay Method, by R. H. Gnaedinger, 5 pp., illus.,

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, June 1965, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, June and July 1965, 10 and 12 pp., respectively, illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the months indicated.

(Chicago) Monthly Summary of Chicago's Wholesale Market Fresh and Frozen Fishery Products Receipts, Prices, and Trends, May and June 1965, 15 pp. each. (Market News Service, U. S. Fish and Wildlife Service, U. S. Customs House, 610 S. Canal St., Rm. 704, Chicago, Ill. 60607.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and weekly wholesale prices for fresh and frozen fishery products; for the months indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, June 1965, 11 pp. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; Gulf menhaden landings and production of meal, oil, and solubles; fishery imports at Mobile, Ala., Morgan City and New Orleans, La., Miami, Fla., and Houston, Port Isabel, and Brownsville, Tex.; and sponge sales; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, June and July 1965, 4 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City, together with cumulative and comparative data on fishery products and shrimp production; for the months indicated.

New England Fisheries--Monthly Summary, May 1965, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial-fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary--April and May 1965, 19 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the months indicated.

Oceanographic Observations, 1962, East Coast of the United States, by Joseph Chase, Data Report 9, 3 microfiche cards, illus., Aug. 1965, distribution

limited. (Branch of Reports, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington, D. C. 20240.)

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, June and July 1965, 9 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the months indicated.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

"Effect of temperature on the development of salmon eggs," by Bobby D. Combs, article, *The Progressive Fish-Culturist*, vol. 27, no. 3, July 1965, pp. 134-137, processed, single copy 25 cents.

This is a Salmon Hatchery, Circular 25, 7 p., illus., printed, revised 1963, 5 cents.

## MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

### ACCLIMATIZATION:

Transplantation of Fish and Aquatic Invertebrates in 1962, U.S.S.R., by A. F. Karpevich and I. Ye. Lokshina, Technical Translation No. 65-30833, 27 pp., printed, April 27, 1965, \$2. (Translated from the Russian, *Voprosy Ikhtologii*, vol. 5, no. 1, 1965.) Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Port Royal and Braddock Rds., Springfield, Va., 22151.

### AMINO ACIDS:

"The composition of essential and certain nonessential amino acids in selected Hawaii fish," by Felicitas S. Cabbat and Bluebell R. Standal, article, *Journal of Food Science*, vol. 30, no. 1, 1965, pp. 172-177, printed. Institute of Food Technologists, 510-522 No. Hickory St., Champaign, Ill. 61823.

### ANTARCTIC RESEARCH:

Biology of the Antarctic Seas II, Antarctic Research Series, vol. 5, 265 pp., illus., printed, August 1965, \$12.00. American Geophysical Union, 1145 19th St., NW, Washington, D. C. 20036. Among other chapters includes "Oceanographic Investigations in McMurdo Sound, Antarctica," and "Studies of the Midwater Fishes of the Peru-Chile Trench."

### AUSTRALIA:

Australian Journal of Marine and Freshwater Research, vol. 16, no. 1, April 1965, 131 pp., illus., printed, single copy 10s. (about US\$1.40). Editorial and Pub-



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lications Section, CSIRO, Sixth Floor, 372 Albert St., East Melbourne, C2, Australia. Contains the following articles: "Studies on the physiology of a shrimp, *Metapenaeus* sp. (Crustacea: Decapoda: Penaeidae). II--Endocrines and control of moulting; and III--Composition and structure of the integument"; by W. Dall. Also, "Southern bluefin tuna populations in south-west Australia," by J. S. Hynd; and "Dynamics of two populations of the humpback whale, *Megaptera novaeangliae* (Borowski)," by R. G. Chittleborough.

**Current Research on Australian Fishes**, by G. L. Kesteven, Collected Reprint 558, 9 pp., illus., printed. (Reprinted from *Proceedings of Australian Society of Animal Production*, vol. 5, Aug. 1964, pp. 312-320.) Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Cronulla, N.S.W., Australia.

#### CANADA:

**The Canadian Fish Culturist**, Issue 34, May 1965, 39 pp., illus., printed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Some of the articles are: "The effect of a marine seismic exploration on fish populations in British Columbia coastal waters," by Roger K. Kearns and Forbes C. Boyd; and "A device for injecting juvenile fish into a pressure conduit," by P. Ryan.

#### CANNING:

"Heat adhesion of fish meat to tin-plate," by Toyoo Takashi and Teruko Tanaka, article, *Chemical Abstracts*, vol. 62, April 12, 1965, Abstract No. 9695e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

#### CATFISH:

"Feeding channel catfish," by C. W. Deyoe, O. W. Tiemeier and S. Wearden, article, *Feedstuffs*, vol. 37, Jan. 2, 1965, pp. 53-54, printed. Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis, Minn.

#### CAVIAR:

"Alguns aspectos da preparação de caviar" (Some aspects of caviar preparation), by A. Torres Botelho, article, *Conservas de Peixe*, vol. 20, no. 230, May 1965, pp. 29, 32, printed in Portuguese. Sociedade de Revista Conservas de Peixe, Lda., Regueirao dos Anjos, 68, Lisbon, Portugal.

#### CEYLON:

**Bulletin of the Fisheries Research Station, Ceylon**, vol. 17, no. 2, Dec. 1964, 160 pp., illus., printed, single copy Rs. 5.00 (about US\$1). The Fisheries Research Station, P. O. Box 531, Colombo, Ceylon. Some of the articles are: "A guide to the fresh-water fauna of Ceylon, supplement 2," by C. H. Fernando; "Predation of tuna long-line catches in the Indian Ocean by killer-whales and sharks," by K. Sivasubramanian; "Pearl oyster survey, Gulf of Manaar, 1964," by C. H. Fernando; "Gill damage in netted *Tilapia mossambica* Peters," by C. H. Fernando and M. T. T. Fernando; "Hatching and rearing of carp in the Polonnaruwa Nursery," by H. H. A. Indrasena and W. B. Ellepola; and "The development of Ceylon's fisheries: a symposium."

#### CHARTS:

**Charting Rough Ground and Wrecks**, Research Development Bulletin No. 5, 2 pp., processed, Nov.

1964. White Fish Authority, Lincoln's Inn Chambers, 2/3 Cursitor St., London EC4, England.

#### CHESAPEAKE BAY:

**Atlas of the Distribution of Dissolved Oxygen and pH in Chesapeake Bay 1949-61**, by R. I. Hires, E. D. Stroup, and R. C. Seitz, Graphical Summary Report No. 3, Reference 63-4, 417 pp., illus., processed, Dec. 1963. Chesapeake Bay Institute, The Johns Hopkins University, Baltimore, Md.

#### CHILLING:

**Superchilling**, Research Development Bulletin No. 2, 4 pp., processed, Sept. 1964. White Fish Authority, Lincoln's Inn Chambers, 2/3 Cursitor St., London EC4, England.

#### CLAMS:

"Salinity, temperature, and food requirements of soft shell clam larvae in laboratory culture," by Alden P. Stickney, article, *Ecology*, vol. 45, no. 2, Spring 1964, pp. 283-291, illus., printed. Ecology, Ecological Society of America, Duke University Press, Box 6697, College Station, Durham, N. C.

**Soft Clam Depuration Studies. Chapter I--Design and Operation of a Cleansing Plant**, by Bradford Sterl, Paul J. DeRoche and John W. Hurst; **Chapter II--Laboratory Studies on Shellfish Purification**, by Philip L. Goggins, John W. Hurst and Peter B. Mooney, 37 pp., illus., processed, September 1964. Maine Department of Sea and Shore Fisheries, Augusta, Me.

**Reprints from Proceedings of the National Shellfish Association**, vol. 53, 1962. Oceanographic Institute, The Florida State University, Tallahassee, Fla. 32306:

**Experimental Farming of Hard Clams, *MERCENARIA MERCENARIA*, in Florida**, by R. W. Menzel and H. W. Sims, Contribution No. 202, processed.

**Seasonal Growth of Northern and Southern Quahogs, *MERCENARIA MERCENARIA* and *M. CAMPECHIENSIS*, and Their Hybrids in Florida**, by R. W. Menzel, Contribution No. 201, processed.

#### COD:

"Future of Greenland cod in doubt," article, *The Fishing News*, no. 2714, June 11, 1965, pp. 11, 13, illus., printed, single copy 9d. (about US\$0.10). Arthur J. Heighway Publications, Ltd., Ludgate House, 110 Fleet Street St., London EC4, England.

#### COD AND HADDOCK:

**Causes of Seasonal and Annual Variations in the Density of Cod and Haddock Schools in the Barents Sea**, by M. M. Kamshilov, N. V. Mironova and O. F. Kondratsova, OTS-63-11112, 5 pp., printed, 1964, 50 cents. (Translated from the Russian, *Trudy Soveshchaniy Iktiologicheskoi Komissii Akademii Nauk SSSR*, no. 10, 1960, pp. 117-121.) Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Port Royal and Braddock Rds., Springfield, Va. 22151.

#### COMMERCIAL FISHING:

**The First Book of Commercial Fishing**, by C. W. Harrison, 80 pp., illus., printed, 1964, \$2.65. Franklin Watts, Inc., 575 Lexington Ave., New York, N. Y. 10022. A compact exposition of many aspects of the

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

United States commercial fishing industry. The first few sections give general information on fishing for profits; what happens to the fish we do not eat; fisheries, a vital natural reserve; and the fisherman's watery world. The next several sections cover details of fishing--boats and gear; finding the fish; making the catch; whales, crustaceans, and molluscs; and harvesting the sea's forests. Finally, the author explains about the more than 30,000 species of finfish and many thousands of species of aquatic mammals, crustaceans, and molluscs (illustrated with nearly 200 drawings); fisheries and fishing ports; importance of conservation; and fish for the future. The author emphasizes the need for fishery conservation and management thus: "In one of his State of the Union messages, the late President John F. Kennedy said that in order to meet the nutritional needs of America's swiftly growing population it would be necessary during the next 20 years for commercial fishermen to increase their annual catch of fish and shellfish by 3 billion pounds--an increase of 60 percent over present levels." A short index and a glossary of fishing terms complete this book. Although intended primarily for students, the book should be interesting to the general reader. It is well illustrated with numerous photographs.

#### COMPOSITION:

"Sodium, potassium, and magnesium concentration and weight changes in fish stored in refrigerated sea-water in relation to biochemical changes associated with rigor mortis," by N. Tomlinson, S. E. Geiger, and W. W. Kay, article, *Journal of Food Science*, vol. 30, no. 1, 1965, pp. 125-134, printed. Institute of Food Technologists, 510-522 No. Hickory St., Champaign, Ill. 61823.

#### CRABS:

Report on Preliminary Studies on the Blue Crab in Alligator Harbor and Adjacent Gulf of Mexico with Some Observations on Stone Crab Larvae, by R. W. Menzel, processed, 1964. Oceanographic Institute, The Florida State University, Tallahassee, Fla. 32306.

#### DENMARK:

Foreign Trade Regulations of Denmark, by William Nagel, OBR 65-32, 8 pp., printed, June 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

#### DOLPHIN:

"The dolphins: 'Like an arrow they fly through the sea'," by Emory W. Brown, Jr., article, *United States Naval Institute Proceedings*, vol. 91, no. 7, July 1965, pp. 42-50, illus., printed, single copy 75 cents. U. S. Naval Institute, Annapolis, Md. 21402.

#### ECHO-SOUNDER:

Echo Sounders of Advanced Design, Research Development Bulletin No. 11, 3 pp., processed, May 1965. White Fish Authority, Lincoln's Inn Chambers, 2/3 Cursitor St., London EC4, England.

#### ENZYMES:

"Enzymes in the body cavity of fish," by G. Siebert and I. Bottke, article, *Chemical Abstracts*, vol. 60, March 30, 1964, Abstract No. 8377e, printed, Amer-

ican Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

#### EXPORTS:

U. S. Exports--Commodity by Country, 1964 Annual, FT 410, 592 pp., processed, June 1965, single copy \$2.25. Bureau of the Census, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Presents data of United States exports during 1964 by SITC (Standard International Trade Classification) section by SITC group. Commodity detail shown is that of Schedule B (Statistical Classification of Domestic and Foreign Commodities Exported from the United States) arranged within 3-digit groups of the SITC. Includes data on fresh, processed, and preserved fish and shellfish products by country of destination.

#### FISH COOKERY:

Fish 'n' Tips, 15 pp., illus., printed. Fishery Council, 118 South St., New York, N. Y. 10038. Tells of the wide and varied selection of seafood available today and of its value as a supplier of proteins, minerals, and vitamins. Discusses the advantages of fish for salt-free dieters and for those interested in low caloric intake. Points out what to look for in buying fresh fish and shellfish, and how to store them. Suggests methods of cleaning and cooking to insure maximum retention of flavor. Contains instructions for pan frying, broiling, baking, and steaming various types of fish, including time and temperature charts for preparing fish dishes. Special attention is given to the cooking of clams, lobsters, shrimp, oysters, and scallops. Recipe suggestions for those and other species are included, as well as recipes for sauces.

#### FISH CULTURE:

Fish Cultivation, Research Development Bulletin No. 3, 3 pp., processed, Oct. 1964. White Fish Authority, Lincoln's Inn Chambers, 2/3 Cursitor St., London EC4, England.

#### FISHERY RESOURCES:

Trend of Researches and Conservation on Fisheries Resource in the World, by S. J. Holt, 44 pp., illus., printed in Japanese. Japan Fisheries Resource Conservation Association, 6th Floor, Zenkoku Choson Kaikan Bldg., 1-17, Nagata-cho, Chiyoda-ku, Tokyo, Japan.

#### FISH-LIVER OIL:

"Polyunsaturated fatty-acid content of cod-liver oil," by R. R. Perepletchik, Yu. S. Davydova and E. I. Novikov, article, *Chemical Abstracts*, vol. 59, Dec. 9, 1963, Abstract No. 14206a, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

#### FISH MEAL:

"Potentiometric method for the determination of chloride in fish meal," by N. Sevkovic, D. Veselinovic and N. Stojanovic, article, *Chemical Abstracts*, vol. 58, April 15, 1963, Abstract No. 8356a, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

Sanitation Guidelines for SALMONELLA Control in Processing Industrial Fishery Products, ARS 91-51, 16 pp., illus., printed, May 1965. Animal Disease

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Eradication Division, Agricultural Research Service, U. S. Department of Agriculture, Hyattsville, Md. 20251. Offers guidelines for operating procedures and product handling methods for fish meal processors that should result in a *Salmonella*-free product. The guidelines contain specifications for fish meal plant buildings, moisture control, workers' hygienic procedures, raw material handling, cleaning and disinfecting, dust control, containers and transportation of processed material, and finally sampling and laboratory examination. *Salmonella* bacteria cause infectious diseases, including Typhoid Fever, in both man and animals.

"Value of fishmeal preserved with formalin for fattening pigs," by F. Dejneka, article, *Roczniki Nauk Rolnych*, vol. 83, 1963, p. 193, printed in Polish. Polska Akademia Nauk, Warsaw, Poland.

#### FISH OILS:

"Gas chromatographic investigations on the components of oil extracted from *Xiphias gladius* (swordfish) head bones," by I. G. Labruto and A. Pastura, article, *Chemical Abstracts*, vol. 60, Feb. 3, 1964, Abstract No. 3208d, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Studies on prevention of deterioration in commercial sardine oil," article, *Annual Report of the Central Institute of Fisheries Technology, Ernakulam, India*, 1963-64, p. 31, printed. Pal and Co., Broadway, Ernakulam, India.

#### FISH POISON:

"Fish poisonings: Their diagnosis, pharmacology, and treatment," by Bruce W. Halstead, article, *Clinical Pharmacology and Therapeutics*, vol. 5, no. 5, 1964, pp. 615-627, printed. C. V. Mosby Co., 3207 Washington Bldg., St. Louis, Mo.

#### FISH POPULATIONS:

*Manual of Methods of Fish Population Analysis*, by J. A. Gulland, Flb/T40, 64 pp., illus., processed, April 1964, distribution restricted. Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, Rome, Italy.

#### FISH PROTEIN CONCENTRATE:

Deodorisation of Aquatic Animal Products, Japanese Patent, March 29, 1961. Tokkyocho (Patent Office), No. 1, Sannen-cho, Kojimachi-ku, Tokyo, Japan. A deodorized fishery product (fish meal), suitable for use as supplementary protein for human beings or as food additives to sausages and ice-cream, is produced by extracting fat from the fish meal with an organic solvent and then carrying through additional chemical procedures.

"Studies on the effect of drying on the nutritive value of fish meals," article, *Annual Report of the Central Institute for Fish Technology, Ernakulam, India*, 1963-64, p. 93, printed. Pal and Co., Broadway, Ernakulam, India.

#### FISH SAUSAGE:

"Manufacturing sausages from frozen yellowtail tuna," by Z. A. Yakovleva and G. S. Khristoferzen, article, *Rybnoe Khoziaistvo*, vol. 40, no. 7, 1964, pp. 69-70,

printed in Russian, single copy 50 Kop. (about US\$0.55). Rybnoe Khoziaistvo, V. Krasnosel'skaia 17, Moscow B-140, U.S.S.R.

#### FISH SILAGE:

"Fish waste for feeding pigs. 3--'Siloryb'-fish silage made from waste of fat fish for fattening pigs; 4--Flakes of potato and fish made with waste of fat fish as feed for fattening pigs," by C. Lewicki, article, *Roczniki Nauk Rolnych*, vol. 83, 1963, pp. 135, 305, printed in Polish. Polska Akademia Nauk, Warsaw, Poland.

#### FOOD:

*Fish as Food, Vol. III--Processing: Part 1*, edited by Georg Borgstrom, 503 pp., illus., printed, 1965, \$17.50. This is the third volume of a four-volume work which reviews the knowledge of marine and fresh-water animals and plants used as food. The basic fields of production, biochemistry, and microbiology were covered in volume I. The second volume presented the "public health" aspects of fish--nutrition, sanitation, handling, and uses. The fourth volume is expected to discuss canning, handling of fresh fish, freezing, and radiation preservation. This volume, which was intended originally to have been the last, covers several types of fish processing--drying and dehydration, smoking, salting (especially herring and cod), marinating, and some others unique to particular regions of the world and to highly industrialized nations. Historically, the processing of fish and shellfish through drying and salting predates the preservation of any other food. The importance to human as well as animal nutrition of appropriately processed fishery products can scarcely be overemphasized. The first chapter of this book covers theoretical and practical aspects of fish drying and dehydration. The physics and chemistry of wood smoke as well as techniques for smoking fish are explained in the next chapter. Following are chapters discussing the salting of herring and cod; manufacturing processes, keeping properties, and chemical and microbiological actions of cold, cooked, and fried marinades; Scandinavian anchovies and herring tidbits and their preparation; processing of the genuine cured anchovy from *Engraulis encrasicolus* Linnaeus. Other chapters explain the preparation of exotic fermented and dried seafood products in Southeast Asia in some detail; whale products as food and fish sausage manufacturing (both almost exclusively Japanese); recently developed concepts and their application to industrial fish processing, especially fish solubles; regional development of fisheries and processing; and fish meal manufacture, properties, and utilization. "Only through wise utilization and efficient processing is it possible to save these extremely perishable riches of the oceans and fresh waters and place them within reach of the consuming public independent of seasons and of fishing fortunes--and mostly far removed from the catching grounds," comments the editor. This volume should be of primary interest to food technologists, but will also be valuable to those in import-export trade, processing (canning, freezing, etc.), marketing, and distribution. (See *Commercial Fisheries Review*, Sept. 1962, p. 132, for review of Volume I; March 1963, p. 106, for review of Volume II.) Anyone wishing to learn more about fish as food should read all three volumes.

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#### FOOD AND AGRICULTURE ORGANIZATION:

General Fisheries Council for the Mediterranean, Eighth Session, FAO/Rome, 10-15 May 1965, Report, 41 pp., processed in French and English, 1965. General Fisheries Council for the Mediterranean, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, Rome, Italy. Contains a summary record of the plenary meetings; program of work, recommendations, and resolutions adopted at the session; a list of participants; and summary record of the technical committees' meetings and review of the implementation of the work program of the 7th Session. Strengthening of the Fisheries Division of FAO was endorsed by the Council.

Inter-session Report (1963-1964) of Technical Committee II, Craft and Gear Sub-Committee, Food Technology Sub-Committee and Socio-Economics and Statistics Sub-Committee Submitted to the 11th Session of the IPFC, Occasional Paper 65/2, 127 pp., processed, 1965. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, FAO Regional Office for Asia and the Far East, Bangkok, Thailand. An account of the developments in the Member Countries during 1963-64 in the fields of fishing craft, harbors, gear, fishing enterprises, training of boat builders and fishermen, fish handling, processing, distribution, technical assistance programs, and documentation. Also includes information of action taken by member governments as well as by FAO on recommendations made by the Council at its 10th Session, held at Seoul, Republic of Korea, Oct. 10-25, 1962. Member countries are Cambodia, Ceylon, Hong Kong, India, Japan, Korea, Malaysia, Pakistan, Philippines, Thailand, the United States, and Viet Nam.

Yearbook of Fishery Statistics, 1963 (Fishery Commodities), vol. 17, 450 pp., processed in French, Spanish, and English, 1965, \$6.50. Food and Agriculture Organization of the United Nations, Rome, Italy. (Available from Columbia University Press, International Documents Service, 2690 Broadway, New York, N. Y. 10027.) This volume covers disposition of the world's catches and both production and international trade data by types of fishery commodities during 1963. The tables are arranged in 8 sections. The first section consists of 3 subsections showing summaries for: (1) disposition of catch; (2) production of preserved and processed fishery commodities; (3) international trade in fishery products. The remaining 7 sections are devoted to these fishery commodity groups: fresh, chilled, or frozen fish; dried, salted, or smoked fish; fresh, frozen, dried, salted, and otherwise processed crustaceans and molluscs; fish products and preparations, whether or not in airtight containers; crustacean and mollusc products and preparations, whether or not in airtight containers; oils and fats of aquatic animal origin, crude or refined; and meal, solubles, and similar animal feedstuffs of aquatic origin. Each of the 7 sections contains 3 subsections: (1) production of the commodity subgroups, by countries and products; (2) imports and exports of the commodity group, by countries; and (3) exports from principal exporting countries, by commodity subgroups, broken down by national items.

#### FOOD MANAGEMENT:

Available from the Cooperative Extension Service, University of Massachusetts, Amherst, Mass.:

Care and Handling of Prepared Frozen Foods in Food Service Establishments, by A. T. Miller and others, Food Management Leaflet 9, 8 pp., illus., printed, Jan. 1965. Reviews briefly the way that foods react to freezing and frozen storage; discusses the reasons why prepared frozen foods require special care and handling; and suggests measures which will help the food service operator to protect both the quality of his product and the health of his customers.

Purchasing Food for Food Service Establishments, by Charles E. Eshbach and Albert L. Wrisley, Food Management Leaflet 10, 22 pp., illus., printed, April 1965. Good food purchasing can best be described as having the right product at the right place at the right time, and at a price that you wish to pay. It is one of the major activities in the operation of any food service establishment, according to the authors. This leaflet covers the requirement of the food buyer for a variety of knowledge and how to acquire that knowledge--of the needs of the establishment, of the market in which he buys, of the products he must purchase, of the procedures he must use, and of the results (including handling) of his purchases. The operator who maintains a close contact with the desires of his customers is able to adjust to change before his operation is adversely affected, concludes the leaflet.

#### FRANCE:

Bulletin d'Information, no. 19, May 1965, 23 pp., processed in French. Comité Local des Pêches Maritimes de Bayonne, Bayonne, France. Contains, among others, these articles: "La campagne thonière africaine" (African tuna season); "La campagne expérimentale du 'Tutina' dans le Golfe d'Aden" (The exploratory cruise of the "Tutina" in the Gulf of Aden); "L'Organisation de la campagne sardinière" (The organization of the sardine season); and "La campagne de l'anchois" (The anchovy season).

"Le Panorama des pêches françaises" (Panorama of French fisheries), articles, France Pêche, no. 95, May 1965, pp. 52-87, illus., printed in French, single copy 2.50 F. (about US\$0.50). France Pêche, Boite Postale 179, Lorient, France. A complete overview of the French fishing industry in 1964. Contains sections on the Law of the Sea, international fishery conventions, protection of coastal waters, imports and exports, the Common Market, and third countries and the Franc Zone. Also covers at length the development of the French fish market in 1964, its general organization, with special attention to price stability problems. Discusses production difficulties in a complex economy, further exploitation of resources, aid to foreign and domestic fisheries, personnel involved in the fishing industry, and fishery research programs in effect. Finally, conclusions by J. S. Parquic, president of the Central Committee on Maritime Fisheries, are presented. Included is a four-page spread of statistical graphs and tables. Among them: a graph of the value and quantity of French fish production, 1962-64; a graph showing the changes in catches by principal species, 1959-64; a table of values and tonnage of France's Mediterranean catch by port of entry, 1959-



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64, and by species, 1962-64; and a graph of the comparative increase in production of 11 of France's principal ports, 1963-64.

#### **FREEZING:**

"Continuous mechanical IQF freezer for fillets, sea-foods developed," article, *Quick Frozen Foods*, vol. 27, no. 9, April 1965, pp. 52-54, illus., printed. E. W. Williams Publications, Inc., 1776 Broadway, New York, N. Y. 10019.

#### **FRESH-WATER FISHERIES:**

On the Conservation of Fresh-Water Fisheries Resources in the U. S. A., by Y. Yamanaka, K. Yagi, and Y. Tsuchida, *Overseas Fishery Series* 7, 64 pp., illus., printed in Japanese, March 1965. Japan Fisheries Resource Conservation Association, 6th Floor, Zenkoku Choson Kaikan Bldg., 17-banchi, 1-chome, Nagata-cho, Chiyoda-ku, Tokyo, Japan.

#### **FROZEN FISH:**

"Novyi sposob defrostatsii ryby" (New method of thawing fish), by I. I. Vedernikov, article, *Kholodil'naya Tekhnika*, no. 3, 1965, pp. 45-46, illus., printed in Russian, single copy 60 Kop. (about US\$0.65). Four Continent Book Corp., 822 Broadway, New York, N. Y. 10003.

#### **GEAR:**

"New Brunswick vessel tests new gear," article, *Trade News*, vol. 17, no. 10, April 1965, pp. 8-9, illus., processed. Information and Educational Service, Department of Fisheries, Ottawa 8, Canada. Reports on the highly successful introduction of the drum hauler to Atlantic provinces. Fishermen are enthusiastic about the gear, especially after experiencing favorable results in the initial Atlantic tests--including good catches in February and April, a speed-up in fishery operations, and the drum hauler's easy installation.

#### **GERMAN FEDERAL REPUBLIC:**

Available from Bundesforschungsanstalt für Fischerei, Palmallee 9, Hamburg-Altona 2, Federal Republic of Germany.:

*Archiv für Fischereiwissenschaft*, vol. 15, no. 3, May 1965, 114 pp., illus., printed in German with English abstracts. Some of the articles are: "Observations on the depth range of tagged bluefin tuna (*Thunnus thynnus* L.) based on pressure marks on the Lea tag," by J. Hamre (in English); "Enzyme des aminosäurestoffwechsels in der kabeljau-muskulatur" (Enzymes of amino acid assimilation in the musculature of cod), by G. Siebert, A. Schmitt, and I. Bottke; "Über die bedeutung proteolytischer fermente bei der herstellung nichtsterilisierter fischwaren" (On the significance of proteolytic enzymes in the production of unsterilized fishery products), by V. Meyer; and "Über den quantitativen nachweis von milchsäurebakterien in mariniertem heringsfleisch" (On the quantitative proof of lactic acid bacteria in marinated herring meat), by F. Gehring.

*Informationen für die Fischwirtschaft* (Information for the Fishing Industry), vol. 12, no. 1, 1965, 40 pp., processed in German. Includes, among others, these articles: "Die erste Suchreise des FFS 'Anton Dohren' im Jahre 1965 (85. Reise)" (The first

research cruise of the FRS "Anton Dohren" in 1965--85th voyage); "Deutsche Fischereientwicklungshilfe für Thailand" (German aid for fisheries development in Thailand); "Internationale Bestimmungen über Mindestmachengrößen und Scheuerschutzvorrichtungen in der Hochseefischerei" (International determination of minimum mesh size and chafing gear standards in the high-seas fisheries); and "Internationaler Fischereifahrzeug-Kongress der FAO vom 23.-29.10.65 in Göteborg" (FAO's International Congress on Fishing Vessels, Oct. 23-29, 1965, in Göteborg).

#### **GREAT LAKES:**

*Economic Aspects of the Great Lakes Fisheries of Ontario*, by Harold C. Frick, Fisheries Research Board of Canada Bulletin No. 149, 160 pp., illus., printed, 1965, \$2.50. Queen's Printer and Controller of Stationery, Ottawa, Canada.

#### **HERRING:**

"Herrings are attracted by electric light," by G. Filimonov, article, *Rybnoe Khoziaistvo*, vol. 40, no. 8, 1964, pp. 61-62, printed in Russian, single copy 50 Kop. (about US\$0.55). *Rybnoe Khoziaistvo*, V. Krasnol'skaia 17, Moscow B-140, U.S.S.R.

"Vintersildinnsigene 1965" (Winter herring prospects for 1965), by Finn Devold, article, *Fiskets Gang*, vol. 51, no. 26, July 1965, pp. 378-380, illus., printed in Norwegian. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

Articles from *Fiskaren*, vol. 42, no. 20, May 19, 1965, printed in Norwegian. Norges Fiskerlag, Postboks 172, Bergen, Norway:

"Vintersildfiskarane kan vente sluttoppgjør i slutten av mai" (Winter herring fishermen can expect final settlement by the end of May), pp. 1, 7.

"Vintersildkvantumet 1965 ble 2.434.408 hl" (Winter herring catch in 1965 is 2,434,408 hectoliters), p. 1.

Articles from *Scottish Fisheries Bulletin*, no. 23, June 1965. Fisheries Division, Department of Agriculture and Fisheries for Scotland, Edinburgh, Scotland:

"Forecast for Scottish North Sea and west coast herring fisheries in 1965," by B. B. Parrish and A. Saville, pp. 3-5.

"Herring trawling off the west coast of Scotland," by I. G. Boxter, pp. 23-25, illus.

#### **ICE:**

*Which Kind of Ice is Best?* by J. J. Waterman, Torry Advisory Note No. 21, 9 pp., printed, March 1965. Torry Research Station, Ministry of Technology, P. O. Box 31, Aberdeen, Scotland.

#### **INDIA:**

*Annual Report of the Department of Fisheries, Maharashtra State, Bombay, for the Year 1962-63*, 58 pp., illus., printed, July 1, 1963. Department of Fisheries, Government of Maharashtra, Taraporevala Aquarium, Netaji Subhas Rd., Bombay-2, India. Reviews the progress achieved by the fishing industry, difficulties met and overcome, and projects continued or begun by the Maharashtra State Government for development of the fisheries during the year, July 1, 1962-

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June 30, 1963. Includes information on the marine fisheries; provisions for the fishing industry contained in the Third Five Year Plan; financial assistance to the fish trade; preservation, transport, and marketing; and fish-curing yards. Also discusses the Taraporevala Aquarium and research, fisheries schools and training, cooperatives and socio-economic development, fresh-water fisheries, and technological projects. Contains statistical data on fresh fish shipments into Bombay, 1962/63; trawler landings by month and type of fish; landings by Government of India deep-sea vessels; arrivals of fish at Greater Bombay markets; salt-fish production; and financial statement of shark-liver oil manufacture.

#### INDIAN OCEAN:

"New data on Indian Ocean fishes," by V. V. Nekrasov, article, *Rybnoe Khoziaistvo*, vol. 40, no. 8, 1964, pp. 9-11, printed in Russian, single copy 50 Kop. (about US\$0.55). Rybnoe Khoziaistvo, V. Krasnosel'skaia 17, Moscow B-140, U.S.S.R.

#### INTERNATIONAL COMMISSIONS:

(International Pacific Salmon Fisheries Commission) *Annual Report 1964*, 37 pp., illus., printed, 1965. International Pacific Salmon Fisheries Commission, P. O. Box 1120, New Westminster, B. C., Canada. Explains briefly the origin, history, and purpose of the Commission, and gives a detailed description of its activities in 1964. Discusses the twelve formal meetings of the Commission held in 1964, regulations for fishing in Canadian and United States Convention waters, and emergency amendments promulgated. Reports on the 1964 sockeye fishery: a decline much smaller than predicted, sockeye escapement, and rehabilitation. Analyzes comparative data on numbers of fry per pink salmon spawn: from 1961-1964. Discusses the Commission's continued concern for watershed improvement on the salmon rivers, investigation of the problems presented by increased log transport on the rivers, and further construction of fishways and other means of protection.

#### IRRADIATION PRESERVATION:

*Radiation Preservation of Foods Program: Proceedings of Contractors' Meeting (8th)*, U. S. Army Natick Laboratories, Natick, Massachusetts, October 7-9, 1963, edited by Frank R. Fisher and Edward S. Josephson, 196 pp., printed, 1964, \$1.25. U. S. Army Natick Laboratories, Natick, Mass.

*Radioactive Isotopes in Soviet Food Industry*, FSTC-381-T64-144, 33 pp., printed, March 1965. (Translated from the Russian, *Pishchevaya Promyshlennost' i Sel'skoye Khozyaystvo SSSR*, 1961, pp. 77-101.) U. S. Army Foreign Science Technical Center, Washington, D. C. 20315.

*Study of Irradiated-Pasteurized Fishery Products*, Oct. 1, 1963-Sept. 30, 1964, by Joseph W. Slavin and Louis J. Ronsivalli, TID-21600, 54 pp., printed, Nov. 30, 1964, \$3. U. S. Atomic Energy Commission, Washington, D. C. (For sale by the Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Port Royal and Braddock Rds., Springfield, Va. 22151.)

#### JAPAN:

*Marine Fisheries Catches for 1964 (Preliminary)*, 14 pp., illus., printed in Japanese, 1965. Statistical Research Division, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-ku, Tokyo, Japan.

"The modern fish finder and its application in Japan," by Y. Tawara, article, *IPFC Current Affairs Bulletin*, no. 42, April 1965, pp. 1-16, illus., printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Far East, Maliwan Mansion, Phra Atit Rd., Bangkok, Thailand.

*Yearbook of Fisheries--1965*, No. 12, 608 pp., illus., printed in Japanese, 1,900 yen (about US\$5.28) plus postage. Suisansha, 8banchi, Sanei-cho, Shinjuku-ku, Tokyo, Japan.

#### LAW OF THE SEA:

"Offshore claims and problems in the North Sea," by Richard Young, article, *American Journal of International Law*, vol. 59, no. 3, July 1965, pp. 505-522, printed, single copy \$3.50. *American Journal of International Law*, 2223 Massachusetts Ave. NW, Washington, D. C. 20008. Investigation of possibly very large petroleum and natural gas deposits in the continental shelf under the North Sea is now being made. However, for centuries the North Sea has been one of the world's major fishery regions and the avenue to the world's busiest seaports. Thus all three of the principal uses of the seas--fishing, navigation, and the exploitation of mineral resources--are expected to meet for the first time on a large scale in an area where all are of major importance. The diplomatic and legal process of reconciling the various interests will provide the first thoroughgoing test of the adequacy of the principles laid down by the 1958 Geneva Convention on the Continental Shelf. This article reviews some of the geographical and economic factors involved in the North Sea situation, notes some of the technical and legal developments that have already occurred, and considers those elements in the light of the various interests of adjacent countries and legal principles concerned.

#### MACKEREL:

"Minimipriset pa makrill hojt med 5 ore--koparna hade tillstyrkt 15 ores hojning" (The minimum price for mackerel increased by 5 ore--buyers have added on a 15-ore increase), by Ingemar Gerhard, article, *Svenska Vastkustfiskaren*, vol. 35, no. 10, May 25, 1965, pp. 172-173, printed in Swedish. Svenska Vastkustfiskarnas Centralforbund, Ekonomiskottet Postbox 1014, Goteborg 4, Sweden.

#### MARICULTURE:

"Mariculture--its recent development and its future," by Victor L. Loosanoff, article, *Agricultural Engineering*, vol. 46, no. 2, Feb. 1965, pp. 73, 93, 97, printed. American Society of Agricultural Engineers, 505 Pleasant St., St. Joseph, Mich.

#### MARINE AIDS:

*Light List*, Vol. V--Mississippi River System, 292 pp., illus., printed, 1965, \$1.75. U. S. Coast Guard, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Contains a list of lights, fog sig-

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nals, buoys, and daybeacons for the Mississippi River System of the United States, Second Coast Guard District.

#### NETHERLANDS:

Visserij in Cijfers 1964 (Fisheries in Figures, 1964), Verslagen No. 129, 62 pp., illus., processed in Dutch, May 1965. Landbouw-Economisch Instituut, Conradskade 175, 's-Gravenhage, Netherlands.

#### NORTH AMERICA:

"Future of North American fisheries examined," article, Trade News, vol. 17, no. 11-12, May-June 1965, pp. 10-16, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

#### NORWAY:

Articles from Fiskets Gang, vol. 51, 1965, printed in Norwegian. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway:

"Lonnsomheten av fiskefartoyer over 40 fot i 1963" (Profitability of fishing vessels of over 40 feet in 1963), no. 20, May 20, pp. 277-286, illus.

"Rapport til fiskeridirektoren vedrorende leitetjenesten med M/S 'Arne Hovden' pa stor- og varsildfiske og i Nordsjoen in 1965" (Report to the Fishery Department concerning fish-scouting with R/V 'Arne Hovden' in the large- and spring-herring fishery and in the North Sea in 1965), by Vermund Dahl, no. 21, May 27, pp. 310-312.

"Rapport om forsøk og veiledningstjeneste i Senjaområdet, Svendgrundun og Malanggrundun, Vesterålsfeltene og yttersiden av Lofoten" (Report on research and exploratory fishing in the Senja region, Svend Ground, Malang Ground, Vesterål Grounds, and outside Lofoten), by O. Chr. Jenssen, no. 25, June 24, 1965, pp. 361-364.

#### OCEANOGRAPHIC VESSELS:

An Evaluation of Recent Research Vessel Construction in the United States, by John Dermody, Jonathan Leiby and Maxwell Silverman, 18 pp., printed, 1964. Scripps Institution of Oceanography, University of California, La Jolla, Calif.

#### OCEANOGRAPHY:

"Canadian fisheries research extends to Caribbean Sea," by S. N. Tibbo, L. M. Lauzier, and A. C. Kohler, article, Trade News, vol. 17, no. 11-12, May-June 1965, pp. 3-9, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Describes in detail an exploratory cruise made by the Canadian oceanographic vessel "Hudson" between St. Andrews, N. B., Cape Hatteras, N. C., and the eastern Caribbean in February 1965. The team of Canadian and American oceanographers and biologists studied the breeding grounds and wintering areas of swordfish and tuna. The program was designed primarily to provide biological information on the distribution, movements, size, food and feeding habits, spawning areas, and seasons of those species, and oceanographic information on the temperature and salinity in which those fish live. Long-lining, plankton tows, and hydrographic observations were the principal activities.

Current Measuring by Towed Electrodes; Observations in the Arctic and North Seas, 1953-59, Fishery Investigations Series, II, vol. 23, no. 8, printed, 1965, 47s. 6d. (US\$9.60 when ordered in the United States). Ministry of Agriculture, Fisheries and Food, London, England. (Available from the British Information Services, 845 Third Ave., New York, N. Y. 10022.)

#### Development of Buoy-Mounted Oceanographic Sensors

(BMOS), by Don J. Cretzler and others, 131 pp., illus., printed, Feb. 15, 1965, \$1. Bisset-Berman Corp., G Street Pier, San Diego, Calif.

F.R.V. "Derwent Hunter," Scientific Reports of Cruises 1950-58, Report 39, 156 pp., illus., processed, 1965. Marine Laboratory, Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Cronulla, Sydney, Australia.

"The jet net, a new high-speed plankton sampler," by William D. Clarke, article, Journal of Marine Science, vol. 22, no. 3, 1964, pp. 284-287, illus., printed, Sears Foundation for Marine Research, Bingham Oceanographic Laboratory, Yale University, New Haven, Conn.

#### Oceanographic Cruise USCGC NORTHWIND, Chukchi

East Siberian and Laptev Seas, August-September 1963, Oceanographic Report No. 6, CG 373-6, 75 pp., illus., printed, March 1965. U. S. Coast Guard Oceanographic Unit, Bldg. 159E, Navy Yard Annex, Washington, D. C. 20390.

Available from Compass Publications, Inc., 1111 N. 19th St., Arlington, Va. 22209:

#### A Glossary of Ocean Science and Undersea Technology

Terms, edited by Lee M. Hunt and Donald G. Groves, 180 pp., illus., processed, 1965, \$5.95. "Oceanography is not a science, but rather it is the magnificent combination of all other sciences that are in any way applicable to the watery seven-tenths of our planet," explains the preface. Today, interest in our global sea has reached international proportions and has brought into the field many firms, scientists, engineers, and technicians to whom at least part of the language of oceanography is new. This book is for those people and for any others interested in the sea. It is an alphabetical compilation of terms defined concisely and briefly. It describes the most important words in the basic areas of: oceanography, including physical, biological, chemical, geological, and meteorological; oceanographic instrumentation; underwater sound; ocean engineering; diving physiology; and general terms, including abbreviations and acronyms (i.e. AFS - American Fisheries Society).

"Technical Meetings Draw Record Attendance," by Larry L. Booda and Charles W. Covey, article, Under Sea Technology, vol. 6, no. 7, July 1965, pp. 20-23, 25-35, 43. Ocean engineers, the practical men of the sea, are increasingly active applying to operational systems the wealth of information furnished them by oceanographers and other marine scientists. The entire "ocean fraternity" is now benefiting from discovery. Part of the discovery process is the exchange of information through presentation of technical papers. The first half of 1965 was exceptionally fruitful in technical conferences and symposia, climaxed by the Ocean Science and Ocean Engineering

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Conference and Exhibit in Washington, June 14-17. This article is a digest of the activities and noteworthy papers given at 10 technical sessions held in the United States during that period.

Available from U. S. Naval Oceanographic Office, Washington, D. C. 20390:

Manual for Coding and Key punching Biological Data--  
Phytoplankton Deck, Primary Productivity Deck,  
Phytoplankton Pigment Deck, Zooplankton Deck,  
Benthos Deck, Publication M-4 (Provisional), 125  
pp., illus., processed, 1965, \$1.25. This manual provides the necessary instructions and conversion tables for reducing biological and related data collected at biological oceanographic stations to the standard format developed by the National Oceanographic Data Center (NODC). It is intended for use by institutions, agencies, and other contributors interested in furnishing data to NODC for processing; copies of the forms are also available in volume to those who wish to maintain a system compatible with that of the national archive.

Manual for Processing Current Data. Part I--In-  
structions for Coding and Key punching Drift Bottle  
Data, Publication M-6 (Provisional), 26 pp., proc-  
essed, 1965, 40 cents. During the December 1963 meeting of the Committee for the Scientific Exploration of the Atlantic Shelf, a suggestion was made and implemented to set up a storage and retrieval system for drift bottle data at the National Oceanographic Data Center. This provisional publication gives instructions for reporting both reduced release and release-recovery drift bottle data on either the NODC coding form or punch card.

Reference Sources for Oceanographic Station Data.  
Vol. I; Vol. II, compiled by Carmen Johnson, Pub-  
lication C-1 in NODC Catalog Series, 185 pp., 146  
pp., respectively, processed, 1965, \$2 each. This catalog contains a completely revised and updated collection of the material presented in 1961; it is intended as an index of the National Oceanographic Data Center's station data holdings and of the bibliographic reference from which the existing holdings were obtained. The sources are in numerical order and are printed on card stock which may be cut into 3" x 5" cards for use as a card file. Appendixes contain NODC Reference Cruise Number Index by Country, and List of Final Processed Cruises as of July 1, 1964. Additions to this publication, as well as updating and revision of cards, are scheduled to be made periodically.

#### OYSTERS:

Reprints of articles available from the Virginia Institute of Marine Science, Gloucester Point, Va. 23062:

Neurosecretory Changes in the Nervous System of the  
Oyster, CRASSOSTREA VIRGINICA, Induced by Var-  
ious Experimental Conditions, by R. Nagabhushan-  
am, Contribution No. 180, 4 pp., illus., printed.  
(From the Indian Journal of Experimental Biology,  
vol. 2, no. 1, 1964, pp. 1-4.)

Preliminary Report on the Cytochemical Study of the  
Neurosecretory Cells in the Visceral Ganglia of the  
Oyster, CRASSOSTREA VIRGINICA, by R. Nagab-

hushanam, Contribution No. 174, 3 pp., printed.  
(From Science and Culture, vol. 29, Oct. 1963, pp.  
506-507.)

#### PAKISTAN:

Foreign Trade Regulations of Pakistan, by Jackson B.  
Hearn, OBR 65-31, 12 pp., printed, May 1965, 15  
cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

#### PHYSIOLOGY:

"Methods of aging fish provide interesting scientific  
study," by Wayne E. Swingle, article, Alabama Con-  
servation, vol. 35, no. 2, Feb.-March 1965, pp. 12-15,  
illus., printed. Alabama Department of Conservation,  
64 N. Union St., Montgomery, Ala. 36104.

#### PILCHARD:

"Pilchard fisheries: A study," by M. B. Culley, article,  
Fishing News International, vol. 4, no. 2, April-  
June 1965, pp. 183-184, 187-188, illus., printed, single  
copy 6s. 6d. (about 90 U. S. cents). Arthur J. Heigh-  
way Publications Ltd., Ludgate House, 110 Fleet St.,  
London EC4, England. A comparison of the pilchard fisheries of Cornwall, where demand is high and catches are declining; and those of South and South-West Africa, where waters are extremely fertile, but where home demand is comparatively small. The urgent need for Britain to turn its attention to this potentially valuable, now under-exploited resource of the Channel is stressed.

#### POLAND:

"The fisheries of Poland," article, Trade News, vol.  
17, no. 11-12, May-June 1965, pp. 21-22, processed.  
Information and Consumer Service, Department of  
Fisheries, Ottawa, Canada.

Articles from France Pêche, no. 95, May 1965, printed  
in French, single copy 2.50 F. (about US\$0.50). France  
Pêche, Boite Postale 179, Lorient, France:

"L'industrie des pêches polonaises" (The Polish fish-  
ing industry), pp. 34-35, illus.

"Le plan d'expansion de la flotte de pêche polonaise"  
(The plan for expanding the Polish fishing fleet), pp.  
36-38, illus.

Available from Maritime Branch, Polish Chamber of Foreign Trade, ul. Pulaskiego 6, Gdynia, Poland:

"Export of fish and fish products in 1964," article,  
Polish Maritime News, vol. 8, no. 81, May 1965, pp.  
31-32, illus., printed.

"Odra" fishery of Swinoujscie"; "Gryf" deep sea fish-  
ery"; "Deep sea fishing bases," article, Polish Mari-  
time News, vol. 8, no. 82, June 1965, pp. 17-20, illus.,  
printed.

Polish Maritime Economy Facts and Figures, edited  
by Bohdan Sienkiewicz, 160 pp., illus., printed, 1965.  
Contains sections on Poland's seaborne trade, ports,  
shipping, and the shipbuilding industry. A section on  
sea fisheries discusses the history of the Polish in-  
dustry; organization of the fisheries; and fishery prod-  
ucts landings, processing, and foreign trade. In 1936



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(the best of the pre-war years) Polish fishermen landed a total of 23,300 metric tons of salt-water fish, mostly sprats. In 1964, about 244,400 tons of sea fish were landed. A list of addresses includes those for Government agencies concerned with the fishing industry and various fishing companies.

#### POLLOCK:

"Mise en évidence de stéroïdes oestrogènes par chromatoplaque dans l'ovaire salé du colin d'Alaska, Theragra chalcogramma Pallas" (Demonstration on colored plates of estrogenic steroids in the salted ovary of the Alaska pollock, Theragra chalcogramma Pallas), by Tadasi Nomura and Yasuhiko Tsuchiya, article, The Tohoku Journal of Agricultural Research, vol. 14, no. 4, March 1964, pp. 307-313, illus., printed in French. Library, Faculty of Agriculture, Tohoku University, Sendai, Japan.

#### POLLUTION:

Pollution-Caused Fish Kills in 1964, Public Health Service Publication No. 847 (revised), 32 pp., illus., printed, 1965, 25 cents. Public Health Service, U.S. Department of Health, Education, and Welfare, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Presents data on pollution-caused fish kills by State, source of pollution, type of water and water body, month, severity of damage, and others; and cumulative listing of fish kills by river or lake affected.

#### POND FISHERIES:

Warm-Water Ponds for Fishing, by W. W. Neely, Verne E. Davison, and Lawrence V. Compton, Farmers' Bulletin 2210, 16 pp., illus., printed, May 1965, 10 cents a copy. U. S. Department of Agriculture, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402.)

#### POTOMAC RIVER:

Regulations--Potomac River Fisheries Commission for Licensing and Taking of Finfish, Crabs, Oysters, and Soft Shell Clams from the Waters of the Potomac River (effective July 29, 1965), 23 pp., processed, 1965. Potomac River Fisheries Commission, P. O. Drawer 128, Colonial Beach, Va. 22443. Included in these regulations are general instructions pertaining to all fishermen, duties of officers, arrests, and other matters; and those governing licensing of fishermen and gear; the oyster fishery, the oyster inspection tax, and the soft shell clam fishery.

#### PROCESSING MACHINERY:

Articles from Rybnoe Khoziaistvo, vol. 40, no. 7, 1964, printed in Russian, single copy 50 Kop. (about US\$0.55). Rybnoe Khoziaistvo, V. Krasnosel'skaia 17, Moscow B-140, U.S.S.R.:

"Device for breeding of fish," by I. I. Smirnov, S. I. Smirnov, and K. M. Sharaev, pp. 77-78.

"The effect of angle parameters of the knife on the cutting force during slicing of (tuna) fish," by M. A. Yakubov, pp. 75-77.

#### PROTEIN:

"Rapidity of the changes in nitrogenous constituents of fish muscle during autoclaving," by G. N. Kushalov, article, Chemical Abstracts, vol. 62, April 12,

1965, Abstract No. 9693h, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

#### PUERTO RICO:

Progress Report, Marine Biology Program, FY-1965, PRNC No. 60, 229 pp., illus., processed, April 1965. Puerto Rico Nuclear Center, University of Puerto Rico, Mayaguez, P. R. Reports on the program of research at the Puerto Rico Nuclear Center, including projects on: measurements of biological productivity (of plankton); analysis for selected trace elements (in sea water, marine organisms, river water, and other materials); measurements of concentration factors of selected organisms (sea urchin, some algae) for certain radioisotopes; measurements of radioactivity and radioisotopes now present in the marine organisms, waters, and bottom sediments off Puerto Rico; and background observations in physical and chemical oceanography off the west coast of Puerto Rico. A marine ecology project has been carried out on a limited scale in connection with 2 of the other projects. Ecological studies are concerned primarily with food web relationships.

#### QUALITY:

Temperature Measurement and Fish, by J. Graham, Torry Advisory Note No. 20, 12 pp., illus., printed, Jan. 1965. Torry Research Station, Ministry of Technology, P. O. Box 31, Aberdeen, Scotland.

#### RADIATION:

Effects of Nuclear Explosion on Marine Biology, edited by M. B. Schaefer, 144 pp., printed, Aug. 1956, \$1. Scripps Institution of Oceanography, University of California, La Jolla, Calif.

#### RETAILING:

The Care of the Fishmonger's Fish, by G. H. O. Burgess, Torry Advisory Note No. 1, 8 pp., illus., printed, Nov. 1963. Torry Research Station, Ministry of Technology, P. O. Box 31, Aberdeen, Scotland.

#### SALMON:

"Experiment using electrical fencing to stop the salmon at Luvén'ga River," by L. A. Petrenko and G. M. Mishelovich, article, Rybnoe Khoziaistvo, vol. 40, no. 8, 1964, pp. 41-43, printed in Russian, single copy 50 Kop. (about US\$0.55). Rybnoe Khoziaistvo, V. Krasnosel'skaia 17, Moscow B-140, U.S.S.R.

Processed leaflets from the Alaska Department of Fish and Game, Subport Bldg., Juneau, Alaska 99801.

Abundance, Size, Age and Survival of Red Salmon Smolts from the Ugashik Lakes System, Bristol Bay, 1964, by Michael L. Nelson, Informational Leaflet 62, 34 pp., illus., June 5, 1965.

The Age Composition of King Salmon Caught on Sport Fishing Gear in Southeastern Alaska, by Gary Finger and Robert Armstrong, Informational Leaflet 60, 15 pp., illus., May 25, 1965.

King Salmon (ONCORHYNCHUS TSHAWYTSCHA) Spawning Ground Surveys in the Behm Canal Area of Southeastern Alaska, by Vaughn Anthony, Gary Finger, and Robert Armstrong, Informational Leaflet 63, 39 pp., illus., processed, June 9, 1965.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Red Salmon Spawning Ground Surveys in the Nushagak and Togiak Districts, Bristol Bay, 1963, by Michael L. Nelson, Informational Leaflet 61, 24 pp., illus., June 1, 1965.

#### SANITATION:

"Diocid, a new disinfecting agent for the fishing industry," by L. N. Smolina and Yu. A. Ravich-Shcherbo, article, *Rybnoe Khoziaistvo*, vol. 40, no. 7, 1964, pp. 63-66, printed in Russian, single copy 50 Kop. (about US\$0.55). *Rybnoe Khoziaistvo*, V. Krasnoselskaia 17, Moscow B-140, U.S.S.R. Diocid is a mixture of 1 hexa-decyl pyridinium bromide with ethanol mercurio-chloride.

#### SARDINES:

"Technochemical properties of Atlantic sardines and factors affecting their quality in industrial processes," by G. S. Khristoferzen and N. V. Timofeeva, article, *Chemical Abstracts*, vol. 62, April 12, 1965, Abstract No. 9697g, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

Articles from *Tidsskrift for Hermetikindustri* (Norwegian Canners Export Journal), vol. 51, no. 6, June 1965, illus., printed. *Tidsskrift for Hermetikindustri*, Stavanger, Norway:

"Brisling--a product of Norway," pp. 214-220, in English.

"Sortering og frysing av brisling" (Grading and freezing of brisling sardines), by Per Tollefsen, pp. 209-211, in Norwegian.

#### SEALS:

"Feeding habits of the New Zealand fur seal (*Arctocephalus forsteri*)," by R. J. Street, article, *Fisheries Technical Report No. 2*, pp. 1-20, illus., printed, 1964. New Zealand Marine Department, P. O. Box 2395, Wellington, New Zealand.

#### SEAWEED:

"Syr'evye zapasy morskikh vodoroslei i perspektivy dal'neishego razvitiya promysla vodoroslei i trav v moryakh Dal'nego Vostoka" (Reserve stocks of marine seaweeds and prospects for the subsequent development of the algal and grass industry in the seas of the Far East), by V. F. Sarochan, article, *Referativnii Zhurnal-Biologiya*, 1964, Abstract No. 7V38, printed in Russian. *Akademiia Nauk SSSR, Institut Nauchnoi-Informatsii*, Moscow, U.S.S.R.

#### SHARK:

"Sharks and Survival--Some valuable tips revealed in new book," article, *Sealift Magazine*, vol. 15, no. 6, June 1965, pp. 15-18, illus., printed, single copy 20 cents. *MSTS Sealift Magazine*, U. S. Department of the Navy, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

#### SHELLFISH:

National Shellfish Sanitation Program Manual of Operations. Part III--Public Health Service Appraisal of State Shellfish Sanitation Programs, 27 pp., illus., processed, 1965, 40 cents. Public Health Service, U. S. Department of Health, Education, and Welfare, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office,

Washington, D. C. 20402.) Since 1925 the Public Health Service has worked with the states and the shellfish industry to insure that shellfish shipped in interstate commerce will be safe to eat. Each shellfish-shipping state adopts laws and regulations for sanitary control of the shellfish industry, makes sanitary and bacteriological surveys of growing areas, delineates and patrols restricted areas, inspects shellfish plants, and conducts any additional work necessary to insure that shellfish for consumption are healthful. Each state annually issues numbered certificates to shellfish dealers who comply with the sanitary standards, and forwards copies of the interstate certificates to the Public Health Service. This manual has been developed in response to a recommendation that objective procedures be established to guide the Public Health Service in reviewing each state shellfish sanitation program and that specific criteria be set up for PHS endorsement of those programs. The manual contains sections on: exercise of Public Health Service responsibilities in the National Shellfish Sanitation Program; the appraisal procedure; preparation of the rating officer's report; and supplemental program statistics required.

#### Proceedings, 5th National Shellfish Sanitation Workshop, November 17-19, 1964, edited by Leroy S. Houser, 249 pp., illus., processed, 1965. Shellfish Sanitation Branch, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington, D. C. 20201.

Contains the agenda of the 1964 Shellfish Sanitation Workshop, a report of papers presented, and related discussions. The appendixes consist of complete texts of papers read. Principal subjects covered are: status of the cooperative program for the certification of interstate shellfish shippers; status of shellfish depuration on a national scale and in the various states; pollution abatement in relation to shellfish sanitation; advances in oyster culture; conference of state sanitary engineers actions evaluating need for certification program for crabmeat and scallops; and regulatory problems on non-certified shellfish imports. Some other topics are: bacteriological criteria for shellfish growing areas; interim bacteriological criteria for oysters; initial survey on *Clostridium botulinum* toxin, type E; heat-shock method of preparation of oysters for shucking; and workshop resolution pertaining to pesticides.

#### SHRIMP:

Effect of Low Salinity on Oxygen Consumption in the Prawn *PALAEMONETES VULGARIS*, by R. Nagabhushanam and R. Sarojini, Contribution No. 177, 1 p., printed. (Reprinted from the *Indian Journal of Experimental Biology*, vol. 1, no. 4, 1963, pp. 231-232.) Virginia Institute of Marine Science, Gloucester Point, Va. 23062.

"Remarkable resource research," by Lyle S. St. Amant, article, *Louisiana Conservationist*, vol. 17, nos. 7 and 8, July-Aug. 1965, pp. 20-23, illus., printed. Louisiana Wild Life and Fisheries Commission, Wild Life and Fisheries Bldg., 400 Royal St., New Orleans, La. 70130. Evaluates 3½ years of intensive research on shrimp in waters along Louisiana's coastline, discussing the merit of that research in relation to the State's shrimp industry as a whole. Gives an overview of the gains in knowledge of shrimp as a result of the research program, including information on the basic shrimp cycle, factors controlling the cycle,

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probable production for 1965, breeding success and postlarval densities, juvenile distribution, density and growth, and early production. Finally, outlines the program's invaluable contribution to the industry.

Shrimp and Beer Party U. S. A., 6 pp., illus., printed, 1965. Shrimp Association of the Americas, 910 E. Levee, Brownsville, Tex. 78521. A recipe leaflet . . . "for serving 8 to 18 to 80 . . . Here are 8 classic dishes to adapt to almost any occasion, any number of guests." Preparation and serving instructions are given for shrimp dunk/U.S.A., neat shrimp in beer, marinated shrimp broil, stuffed shrimp appetizers, and other dishes.

"Utilization of Bering Sea shrimp (review of foreign literature)," by V. S. Gordievskaya, article, Rybnoe Khoziaistvo, vol. 40, no. 7, 1964, pp. 79-80, printed in Russian, single copy 57 Kop. (about US\$0.55). Rybnoe Khoziaistvo, V. Krasnosel'skaia 17, Moscow B-140, U.S.S.R.

#### SPAIN:

"El comercio exterior de conservas en 1964" (Foreign Trade in canned goods in 1964), by Mareiro, article, Industria Conservera, vol. 31, no. 309, March 1965, pp. 67-68, printed in Spanish. Industria Conservera, Calle Marques de Valladares, 41, Vigo, Spain. Dwells principally on canned fishery products--anchovy fillets, sardine, tuna, squid, and others.

#### SPINY LOBSTER:

"Holding wells in cray boats," by W. D. Hughes, article, Commercial Fishing, vol. 3, no. 9, May 1965, pp. 31, 33, illus., printed. Trade Publications Ltd., 26 Albert St., Auckland, New Zealand.

#### SPOILAGE:

"Bacteriology of spoilage of fish muscle. III--Characterization of spoilers," by Peter Lerke, Ralph Adams, and Lionel Farber, article, Applied Microbiology, vol. 13, no. 4, July 1965, pp. 625-630, printed, single copy \$3. The Williams and Wilkins Co., 428 E. Preston St., Baltimore, Md. 21202.

"Biochemical and nutritional studies on East Pakistan fish. VIII--Acetylcholinesterase activity in fresh and decomposed fish tissue and its relation with spoilage characteristics," by M. Qudrat-i-Khuda, H. N. De and N. M. Kahn, article, Chemical Abstracts, vol. 58, June 24, 1963, Abstract No. 14485e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

#### SPORT FISHING:

Sport Fishing Today and Tomorrow, Overseas Fishery Series 6, 44 pp., illus., printed in Japanese. Japan Fisheries Resource Conservation Association, 6th Floor, Zenkoku Choson Kaikan Bldg., 1-17, Nagata-cho, Chiyoda-ku, Tokyo, Japan.

#### SWEDEN:

"Nya fiskesigtnar fran den 1 september 1965" (New fishery signals after September 1, 1965), article, Svenska Vastkustfiskaren, vol. 35, no. 10, May 25, 1965, p. 174, printed in Swedish. Svenska Vastkustfiskarnas Centralforbund, Ekonomiskottet Postbox 1014, Goteburg 4, Sweden.

#### TARIFFS:

"World customs tariffs," article, International Commerce, vol. 71, no. 31, Aug. 2, 1965, pp. 2-12, illus., printed, single copy 35 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) The import tariff systems of about 120 foreign governments are summarized in this article, an initial survey of world markets to aid businessmen. The summary includes most countries--other than those whose foreign trade is a Governmental monopoly (principally communist countries). Where foreign countries' tariff schedules have been published abroad and are fairly current, their availability (including updating services) is reported in the summary. The countries are grouped by region--Western Hemisphere, Europe, Africa, Near East and South Asia, and Far East and Oceania.

#### TEXAS:

Let's Go Fishing, compiled by W. R. Long, 20 pp., printed, 1965. Texas Parks and Wildlife Department, Reagan State Office Bldg., Austin, Tex. 78701.

#### THAILAND:

First Guide to the Literature of the Aquatic Sciences and Fisheries in Bangkok, Thailand, Kasetsart University Fishery Research Bulletin No. 2, 50 pp., printed, April 15, 1965. Committee on Fishery Literature, Faculty of Fisheries, Kasetsart University, Bangkok, Thailand.

#### TIDES:

Manual of Tide Observations, Publication 30-1 (Revision of Special Publication No. 196), 72 pp., printed, June 1965, \$2. Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C., 20230. Contains instructions for observing and recording the rise and fall of the tide and for making the necessary reductions to determine the datum planes and the non-harmonic quantities published in the Tide Tables.

#### TOXICITY:

"Ciguatera and other marine poisoning in the Gilbert Islands," by M. J. Cooper, article, Pacific Science, vol. 18, no. 4, 1964, pp. 411-440, printed. Pacific Science, University of Hawaii, Honolulu, Hawaii 96814.

The Distribution of Ciguatera in the Tropical Pacific, by Albert H. Banner and Philip Helfrich, Technical Report Series No. 3, 48 pp., processed, 1964. Hawaii Marine Laboratory, University of Hawaii, Honolulu, Hawaii.

#### TOXINS:

Biochemistry and Pharmacology of Biotoxins from Marine Animals, by F. Ghirelli, 21 pp., printed, Jan. 1965. Naples Zoological Station, Naples, Italy.

"Marine biotoxins. III--The extraction and partial purification of ciguatera toxin from Lutjanus bohar: use of silicic acid chromatography," by Donald W. Hessel, article, Chemical Abstracts, vol. 61, Oct. 26, 1964, Abstract No. 10920c, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

#### TRADE LISTS:

The following mimeographed trade lists may be bought by U. S. firms from the Commercial Intelligence Di-

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vision, Office of International Trade Promotion, Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. 20230, or from Department of Commerce field offices at \$1 each:

Boat and Ship Builders, Repairers and Chandlers--India, 19 pp., May 1965. Lists the names and addresses, size of firms, and types of vessels (including fishing craft) and provisions handled by each firm. Also contains basic industry and trade data on shipbuilding, repairing, and chandlery (includes fishing vessels).

Canneries and Frozen Foods--Producers and Exporters--Argentina, 10 pp., July 1965. Lists the names and addresses, size of firms, and types of products (including fish and shellfish) handled by each firm. Also contains trade and industry data (including fishery products) on production, exports and imports of canned and frozen foods.

#### TRANSPORTING FISH:

"Transporte de sardinha em camioneta isotérmica" (Transportation of sardines in isothermal trucks), by Alberto de Morais Lobo, article, Conservas de Peixe, vol. 20, no. 230, May 1965, pp. 15, 17-19, 32, printed in Portuguese. Sociedade de Revista Conservas de Peixe, Lda., Regueirão dos Anjos, 68, Lisbon, Portugal.

#### TRAWLING:

Available from White Fish Authority, Lincoln's Inn Chambers, 2/3 Cursitor St., London EC4, England:

An Acoustic Telemetry Link between Trawl and Ship--Measuring the Performance of the Trawl in Fishing Conditions, by Means of Sound Waves, Research Development Bulletin No. 7, 2 pp., processed, Jan. 1965.

Double-Rig Beam Trawling, Research Development Bulletin No. 8, 3 pp., illus., processed, March 1965.

Summarized Report of a Study of the Operation and Performance of the Trawl Winch on a Large Stern Trawler, Research Development Bulletin No. 1, 3 pp., processed, April 1964.

Trawl Gear Investigations, Research Development Bulletin No. 10, 3 pp., processed, May 1965.

Warp Load Meters for Stern Trawlers, Research Development Bulletin No. 6, 5 pp., illus., processed, Dec. 1964.

#### TRINIDAD AND TOBAGO:

Foreign Trade Regulations of Trinidad and Tobago, by Elliot Werner, OBR 65-33, 4 pp., printed, June 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

#### TROUT:

"Trout industry of the Soviet Carpathians", by K. A. Altukhov, article, Rybnoe Khoziaistvo, vol. 40, no. 8, 1964, pp. 27-28, printed, single copy 50 Kop. (about US\$0.55). Rybnoe Khoziaistvo, V. Kransnoel'skaia 17, Moscow B-140, U.S.S.R.

#### TUNA:

"Le 'Boréal' champion de la campagne thonière africaine" (The "Boréal," champion of the African tuna season), by J. Lamarche, article, France Pêche, no. 95, May 1965, p. 31, illus., printed in French, single copy 2.50 F. (about US\$0.50). France Pêche, Boîte Postale 179, Lorient, France.

Chosasen Shoyo Maru Hokokusho (Higashitaiheiyō Nio-keru Maguroshigenchosa Oyobi Kokai-Hokokusho) (Report of the Experimental Boat Shoyo Maru--Cruise Report of Investigations on Tuna Resources in the Eastern Pacific), 465 pp., illus., printed in Japanese with English titles and legends, Aug. 1964. Research Division, Japanese Fisheries Agency, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-ku, Tokyo, Japan. The first section of this detailed report outlines the tuna investigations conducted during a cruise of the Eastern Pacific--purpose and particulars of the investigations, course and dates of the cruise, technical data on the vessel "Shoyo Maru," and Japanese and United States researchers on board and their research work. Results of the investigations are presented in the second section--species of tuna, marlin, and other fish landed; results of oceanographic observations; and evaluation of a special type of long-line gear. The third section discusses problems of Samoa-based Japanese long-line operations. The fourth section covers problems encountered by a long-line vessel calling at a foreign port in the Eastern Pacific. And the final section presents information on business matters related to the cruise--log-book records; a narrative account of the cruise; and reports of deck, engine room, communications, administrative and medical operations.

"Tuna spotting from a balloon," article, Australian Fisheries Newsletter, vol. 24, no. 7, July 1965, pp. 23, 26, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra A.C.T., Australia.

Available from Kanagawa Prefectural Fisheries Experiment Station, 2451, Rokugo, Misaki-cho, Miura-shi, Kanagawa Prefecture, Japan:

On the Distribution of Mean Fork Length and Age Composition of Yellowfin Tuna and Albacore as Related with Distribution of Water Temperature and Distance from Continent in the Tropical Atlantic Ocean, by Jun Nakagome and others, 4 pp., illus., printed in Japanese with English summary, Aug. 1964.

Relation between Monthly Variation of Hooking Rate of Yellowfin Tuna and Monthly Variation of Surface Water Temperature, and between Annual Variation of Hooking Rate of the Fish and Annual Variation of Surface Water Temperature in the Tropical Atlantic Ocean, by Jun Nakagome, 5 pp., illus., printed in Japanese with English summary, March 1965.

#### TURTLES:

"The navigation of the green turtle," by Archie Carr, article, Scientific American, vol. 212, no. 5, May 1965, pp. 78-86, illus., printed, single copy 60 cents. Scientific American, Inc., 415 Madison Ave., New York, N. Y. 10017. These turtles are known to migrate regularly to and from nesting beach and feeding ground. Now it appears they can also navigate well enough to make an island landfall after 1,400 miles at sea.



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## UNITED KINGDOM:

Future Prospects in the Distant-Water Fisheries, by David Garrod and John Gulland, Laboratory Leaflet (New Series) No. 8, 50 pp., illus., processed, May 1965. Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England. There is widespread concern in the United Kingdom regarding the effects of increased fishing on the yields of the distant-water grounds in the North Atlantic and Arctic Oceans traditionally exploited by British fishermen; there is also a growing interest in the potential yields of fishing grounds in the Western and South Atlantic. In this leaflet, the authors have examined the future prospects for the Eastern Atlantic--Northeast Arctic cod and haddock, Iceland cod and haddock, and East Greenland cod; for the Western Atlantic--West Greenland, Labrador, Newfoundland and New England/Nova Scotia cod, Newfoundland haddock, and ocean perch. The long-term prospects for distant-water fisheries are also discussed. "In some stocks the level of production could actually be improved by reducing the amount of fishing, so that, for the purpose of obtaining the maximum amount of protein for the minimum of fishing effort, there is much to be said for some control of the amount of fishing," assert the authors. Appendixes include information on the fishing power of trawlers, sources of data, and the factors causing the decline in catch per unit of effort in North Atlantic fish stocks. Several statistical tables are also included.

"White Fish Authority," by Robert E. Lloyd, article, Geo Marine Technology, vol. 1, no. 7, July 1965, pp. 14-16, processed. Intel, Inc., 1075 National Press Bldg., Washington, D. C. 20004. The British White Fish Authority has given the equivalent of US\$96,600 to the Civil Engineering Department, University of Strathclyde, Scotland, to develop engineering criteria for commercial-scale ocean fish farming installations. Three experts will: (1) investigate problems of enclosing coastal waters; (2) conduct hydrographic studies of several sea lochs; and (3) evaluate the use of warm water effluent from thermoelectric power stations to achieve rapid growth rate of fish. This report on the White Fish Authority's functions explains the status of aquaculture in Britain.

White Fish Authority, Annual Report and Accounts for the Year Ended 31st March 1965, 55 pp., illus., printed, June 1965, 4s. 6d. (about US\$0.65). Her Majesty's Stationery Office, York House, Kingsway, London WC2, England. Covers white fish production, distribution and marketing, research and development, and administration of regulations. Appendixes contain data on quantity and value of white fish landed, 1963-64; the fishing fleet; grant and loan activities; the white fish subsidy for vessels; conservation of stocks; training; and costs and earnings in the in-shore fleet. Also includes the financial statement of the White Fish Industry Board, for the year ended March 31, 1965.

## U.S.S.R.:

"Soderzhanie polineasyshchennykh zhirnykh kislot v zhirakh osnovnykh promyslovnykh ryb Azovsko-Chernomorskogo Basseina" (The content of polyunsaturated fatty acids in the fats of the main commercial fish stocks in the Azov-Black Sea basin), by G. S. Khristoferzen, article, Voprosy Pitaniya, vol. 23,

no. 5, 1964, pp. 17-20, illus., printed in Russian with English summary. Voprosy Pitaniya, Gosudarstvennoe Izdatel'stvo Meditsinskoi Literatury, Moscow, U.S.S.R.

Soviet Research in World Ocean, by L. A. Zenkevich and S. D. Osokin, Technical Translation No. 65-30827, 18 pp., printed, April 26, 1965, \$1. (Translated from the Russian, Morskoy Sbornik, no. 2, 1961.) Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Port Royal and Braddock Rds., Springfield, Va. 22151.

Articles from Rybnoe Khoziaistvo, vol. 40, 1964, printed in Russian, single copy 50 Kóp. (about US\$0.55). Rybnoe Khoziaistvo, V. Krasnosel'skaia 17, Moscow B-140, U.S.S.R.:

"Experience of Volgograd Fishing Trust in the improvement of the organization of work and in the mechanization of loading and unloading operations in the production of refrigerated fish," by Yu. M. Danilov, no. 7, pp. 71-74.

"Improving the planning in the fishing industry," by E. P. Grinko, no. 8, pp. 3-5.

"New successes of Sakhalin fishing kolkhozes," by A. A. Taranov, no. 7, pp. 61-62.

"Some results of the work of the fishing industry in the Azov-Black Sea basin," by I. F. Denisenko, no. 8, pp. 6-8.

## VESSELS:

Decay in Wooden Fishing Boats, Research Development Bulletin No. 4, 3 pp., processed, Nov. 1964. White Fish Authority, Lincoln's Inn Chambers, 2/3 Cursitor St., London EC4, England.

"Konceptje konstrukcyjne malych statkow rybackich" (Constructional designs of small fishing craft), by Tadeusz Wojcik, Witold Wakula, and Lucjan Debski, article, Budownictwo Okretowe, vol. 10, no. 5, May 1965, pp. 144-146, printed in Polish with English table of contents and abstract. Wydawnictwa Czasopism Technicznych NOT, Czackiego 3/5, Warsaw, Poland. Presents the specifications of small fishing vessels (seiner-trawlers) intended both for Polish fisheries and export.

## VITAMINS:

"Physicochemical determination of vitamin D in marine products," by Takeshige Yamakawa, article, Chemical Abstracts, vol. 62, Feb. 1, 1965, Abstract No. 3324f, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"The relation between vitamin A content in livers and the feeding habitat of fishes in the Red Sea," by M. Abdallah and M. K. Salah, article, Journal of Pharmaceutical Science of the United Arab Republic, vol. 2, no. 1, 1961, pp. 135-138, printed. Journal of Pharmaceutical Science of the U.A.R., Al-Majlis Al-A'La Lil-'Ulum, Cairo, United Arab Republic.

## WEATHER CHARTS:

The following processed weather charts, 4 pp., each, are published by the Weather Bureau, U. S. Department of Commerce, Washington, D. C., and are for

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sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, 10 cents each. Charts show stations displaying small craft, gale, whole gale, and hurricane (for coastal chart only) warnings; explanations of warning displays; and schedules of AM and FM radio and TV stations that broadcast weather forecasts and warnings.

Coastal Warning Facilities Chart, Eastport, Me. to Montauk Point, N. Y. 1965.

Small Craft, Gale, and Whole Gale Warning Facilities Chart, Great Lakes: Superior and Michigan, 1965.

#### WHALE OIL:

"Utilization of sperm whale oil. I--Preparation of edible oil. 1--Monoglycerides from whale oils and their molecular distillation," by Mikio Mori and Mitsuo Nagata, article, *Chemical Abstracts*, vol. 58, April 10, 1963, Abstract No. 7049a, printed, American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

#### WHALES:

The Scientific Reports of the Whales Research Institute, no. 19, April 1965, 146 pp., illus., printed. The Whales Research Institute, No. 4, 12 Chome, Nishigashi-dori, Tsukishima, Chuo-ku, Tokyo, Japan. Some of the articles are: "Reproduction of the sperm whale in the north-west Pacific," by S. Ohsumi; "Some information on minke whales from the Antarctic," by T. Kasuya and T. Ichihara; and "Foods of baleen whales in the Gulf of Alaska in the North Pacific," by T. Nemoto and T. Kasuya.

#### WHALING:

"Whales and whaling," article, *Norsk Hvalfangst-Tidende* (The Norwegian Whaling Gazette), vol. 54, no. 4, April 1965, pp. 77-79, printed in Norwegian and English. Hvalfangerforeningen, Sandefjord, Norway.

#### YELLOWTAIL:

Present State and Problems of the Hamachi (Young Yellowtail) Culture in Seto Inland Sea, by F. Matsuo, K. Yashiro, and M. Tachibana, *Overseas Fishery Series* 4, 60 pp., illus., printed in Japanese. Japan Fisheries Resource Conservation Association, 6th Floor, Zenkoku Choson Kaikan Bldg., 1-17, Nagatacho, Chiyoda-ku, Tokyo, Japan.



### TUNA PIZZA BURGERS FOR THE GANG

Here's a unique blend from the Tuna Research Foundation that brings together three of America's favorite foods--burgers, pizzas, and tuna. This is a great recipe to fix when people drop in unexpectedly. (Of course it's fine for company you expect, too.)

Because they're made with convenient canned tuna, you won't have to wait around the broiler forever until the tuna pizza burgers are done. They only take 10 minutes to heat and brown, and you can open up the soda pop in the meantime.

#### TUNA PIZZA BURGERS

$\frac{1}{3}$ cup mayonnaise	$\frac{1}{2}$ cup diced celery
$\frac{1}{2}$ teaspoon salt	2 cans ( $6\frac{1}{2}$ or 7 ounces each) tuna
$\frac{1}{4}$ teaspoon each oregano and basil	in vegetable oil
1 tablespoon minced onion	6 burger buns
	1 can (8 ounces) tomato sauce
	Grated Parmesan cheese

Blend together mayonnaise, salt, oregano, basil, and onion. Mix in celery and tuna. Pile tuna mixture on bottom halves of buns. Spoon tomato sauce on top. Sprinkle with Parmesan cheese. Place under broiler heat until heated through and brown on top (about 10 minutes). Top with other bun halves. Makes 6 servings.





## HIGHLIGHTS IN THIS ISSUE (OCTOBER 1965)



### Features

**PASTEURIZATION OF FISHERY PRODUCTS WITH GAMMA RAYS FROM A COBALT-60 SOURCE**--Shelf-life extension of fishery products through research in radiation preservation (p. 1).

**CONSTRUCTION AND OPERATION OF THE "COBE" PELAGIC TRAWL (1964)**--Details of construction and operation of new experimental gear (p. 10).

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### Trends in the United States Fisheries

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